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Environmental Quality
ENVIRONMENTAL GOVERNING STANDARDS

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Chapter 1

INTRODUCTION

1-1. PURPOSE.

The purpose of this pamphlet is to provide specific criteria and management practices for environmental protection on United States Forces, Korea (USFK) installations. This document implements DoD Instruction (DoDI) 4715.5, "Management of Environmental Compliance at Overseas Installations", dated April 22, 1996 and Overseas Environmental Baseline Guidance Document (OEBGD), dated 15 March 2000.

1-2. APPLICABILITY.

This document applies to USFK installations and facilities directly controlled or directly managed by USFK in the Republic of Korea (ROK). Specifically, these Environmental Governing Standards (EGS) do not apply to:

- a. USFK installations that do not have more than de minimis potential to affect the natural environment (e.g., offices whose operations are primarily administrative, including defense attaché offices, security assistance offices, foreign buying offices and other similar organizations), or for which the USFK Components exercise control only on a temporary or intermittent basis;
- b. Leased, joint use, and similar facilities to the extent that USFK does not control the instrumentality or operation that a criterion seeks to regulate;
- c. Operations of U.S. military vessels or the operations of U.S. military aircraft, or off-installation operational and training deployments. Off-installation operational deployments include cases of hostilities, contingency operations in hazardous areas, and when United States Forces are operating as part of a multi-national force not under full control of the United States. Such excepted operations and deployments shall be conducted in accordance with applicable international agreements, other DoD Directives and Instructions, and environmental annexes incorporated into operation plans or operation orders. However, this document does apply to support functions for U.S. military vessels and U.S. military aircraft provided by the USFK Components, including management or disposal of off-loaded waste or material;
- d. Facilities and activities associated with the Naval Nuclear Propulsion Program, which are covered under E.O. 12344 and conducted pursuant to 42 U.S.C. 7158;
- e. The determination or conduct of remediation to correct environmental problems caused by USFK's past activities; and,
- f. Environmental analyses conducted under E.O. 12114.

1-3. CONFLICTS BETWEEN ENVIRONMENTAL GOVERNING STANDARDS AND OTHER POLICIES AND DIRECTIVES.

- a. Each activity and installation will comply with those portions of DOD and their respective service component land-use and environmental policies and directives that apply overseas to the extent that those policies and directives do not directly conflict with EGS.
- b. Activities and installations that wish to use conflicting DOD or service component policies or directives in lieu of EGS must follow the variance provisions set forth in Section 1-10, or the waiver provisions set forth in Section 1-14, depending on whether the proposed policies or directives are more or less stringent than these EGS.
- c. Activities and installations will notify USFK of any directly conflicting policies or directives they discover.

1-4. REFERENCES.

Required publications are listed in Appendix A.

1-5. EXPLANATION OF ABBREVIATIONS AND SPECIAL TERMS.

Abbreviations used in this circular are explained in the glossary. Special terms used in this document are defined in each chapter.

1-6. BACKGROUND AND GENERAL DEFINITIONS.

- a. For the purpose of this document, unless otherwise indicated, the following definitions apply:
 - (1) Criteria and management practices - particular substantive provisions of the DOD OEBGD, dated March 2000, that have been used by USFK to develop these EGS.
 - (2) Existing facility - any facility/building, source or project in use or under construction before 1 October 1994, unless it is subsequently substantially modified.
 - (3) Environmental Governing Standard (EGS) - a comprehensive set of substantive provisions - typically technical limitations on effluent, discharges, etc., or a specific management practice.
 - (4) New facility - any facility/building, source or project with a construction start date on, or after, 1 October 1994, or a pre-existing facility that has been substantially modified since 1 October 1994.
 - (5) Requirements - particular provisions of U.S. law respecting environmental protection on USFK installations within CONUS; ROK law of general applicability, including those specifically delegated to regional or local governments for implementation, respecting environmental protection and which are generally applied to ROK military; applicable international treaty provisions including the US-ROK SOFA that are used in determining the EGS. USFK installations shall use the EGS as standards for environmental compliance rather than use the individual source documents that have been reconciled by the Environmental Executive Agent in the creation of the EGS.
 - (6) Substantial modification - any modification to a facility/building the cost of which exceeds \$1 million, regardless of funding source.
- b. This document does not create any rights or obligations enforceable against the United States, the DoD, or any of its components, nor does it create any standard of care or practice for individuals. Although this document refers other DoD Directives and Instructions, it is intended only to coordinate the requirements of those directives as required to implement the policies found in DoDI 4715.5. This document does not change other DoD Directives or Instructions or alter DoD policies.

1-7. STRATEGY.

- a. The environmental protection process is dynamic, and officials at all levels are responsible for the frequent review and updating of applicable guidelines for all environmental activities, as directed. It is the policy of USFK to be at the forefront of pollution prevention and environmental compliance and protection. Administrative procedures at all levels of command should be designed to expedite implementation of the most current directives on environmental matters.
- b. For on-installation activities, with few exceptions, the criteria contained in the DOD OEBGD, dated 15 March 2000, have been adopted. For those USFK environmental actions which have off-installation impacts, these EGS incorporate ROK regulations which are uniformly enforced upon the ROK public and private sector, particularly those regulations enforced upon ROK Ministry of National Defense (MND) forces. Where DOD directives and international agreements concerning off-installation

practice are more protective of the environment than uniformly enforced ROK regulations, these EGS have incorporated the more restrictive off-installation requirements.

1-8. PERMITS AND LICENSES

In accordance with the US-ROK SOFA, Korean permits and licenses are not normally required by USFK activities and installations. Specific permits and licenses may, however, be required for certain USFK, U.S. Government, or certain contracted activities as specified herein.

1-9. RESPONSIBILITIES.

- a. The USFK (with the Assistant Chief of Staff (ACofS), Engineer as the proponent staff office within USFK) will--
 - (1) Continuously identify ROK national environmental standards, including those specifically delegated to regional or local governments for implementation, to determine whether they should be incorporated into these EGS; their applicability to DOD installations and activities; and maintain copies of applicable ROK environmental documents, standards and regulations.
 - (2) Consider the US-ROK SOFA and other relevant international agreements.
 - (3) Review the environmental enforcement record and history of the ROK with respect to enforcement activities against the public and private sector (particularly those required of MND forces), and monitor country-specific environmental trends.
 - (4) Consider whether responsibility for construction, operation and maintenance of the facilities rests with the U.S. or the ROK.
 - (5) Evaluate and determine whether the applicable ROK criteria or the DOD baseline are the appropriate performance criteria in the ROK.
 - (6) Consult with the U.S. Embassy in Seoul, U.S. Commander in Chief, U.S. Pacific Command (USCINCPAC), and other DOD components, including the Defense Logistics Agency (DLA) operating in the ROK, during review of the EGS.
 - (7) Review and revalidate EGS at least every two years with USFK or some other appropriate entity (e.g., ROK government, private contractor, non governmental organization or private citizen).
 - (8) Keep USFK components in the ROK informed of current environmental developments and trends.
 - (9) Coordinate USFK component training/education programs for all personnel responsible for environmental compliance. Training/Education programs will be specifically tailored to the ROK.
- b. Military departments and defense agencies will--
 - (1) Ensure compliance with the EGS established by USFK.
 - (2) Ensure their activities and installations allocate the resources required to achieve and maintain compliance with the EGS.
 - (3) Conduct self-environmental compliance audits.
 - (4) Program and budget for environmental compliance projects.
 - (5) Ensure that USFK contracts for services or construction, where performance takes place on the installation, comply with EGS, and are administered to enforce such compliance. Contracts for transfer and delivery of hazardous and petroleum products and for the disposal of hazardous waste (HW) shall include provisions requiring the contractor to comply with appropriate EGS criteria, Korean regulations and other DOD criteria.
 - (6) Ensure that host-tenant agreements address compliance with the EGS.
- c. Installation/Support Group Commanders will--
 - (1) Comply with the EGS.

- (2) Develop and conduct training/education programs to instruct all personnel in the environmental aspect of their jobs.
- (3) Establish an Environmental Protection Council or Environmental Quality Control Committee (or equivalent) to provide the periodic assessment of the installation/support group's environmental compliance programs and projects.
- (4) Incorporate installation environmental compliance auditing into their inspection programs.

NOTE: By offering Area / Support Group commanders the opportunity to centrally manage their environmental compliance programs, the EGS should reduce the administrative burden placed directly upon subordinate, isolated facilities and activities. Area / Support Group environmental management plans must clearly describe responsibilities to ensure sustained compliance with substantive requirements.

1-10. IMPLEMENTATION.

The EGS are effective as of the date of this document. USFK will forward the EGS to each major command and defense agency with an installation in the ROK for further distribution to their installations. DOD components and major commands may issue supplementary criteria that are more protective of the environment than required by the EGS provided that they first obtain the concurrence of USFK. Requests for more stringent criteria will be evaluated based on their impact upon other activities and installations and upon their relationship with ROK governmental agencies. USFK activities and installations must clearly identify variances from the EGS in all requests for resources.

1-11. AUDITING.

- a. Within the context of this document, auditing is the process of conducting a systematic, documented, periodic assessment of USFK installations to determine their overall status of environmental compliance. The objectives of the auditing program are to:
 - (1) Determine overall status of environmental compliance.
 - (2) Improve and enhance installation environmental compliance.
 - (3) Improve and enhance installation environmental program management.
 - (4) Identify and provide support for financial programs and budgets for environmental program requirements.
 - (5) Anticipate future environmental programs.
 - (6) Ensure that USFK, USFK components and USFK installation commanders are effectively addressing environmental problems which could--
 - (a) Impact mission effectiveness.
 - (b) Jeopardize the health or safety of installation personnel or the general public.
 - (c) Adversely impact the environment.
 - (d) Expose the installation and/or its personnel to avoidable financial liabilities as a result of non-compliance with environmental requirements.
 - (e) Erode ROK confidence in the U.S. and the defense establishment.
 - (f) Expose individuals to civil and criminal liability.
 - (7) Ensure all personnel are trained/educated in the environmental aspects of their job.
- b. Installations subject to auditing. All military departments and defense agencies will be responsible for preparing a listing of their installations subject to auditing. Generally speaking, all major and minor installations that would be governed by the regulatory agencies in the U.S. will be candidates for audit. USFK components will establish written procedures for excluding installations where operations pose no significant environmental impact. Such procedures will describe the circumstances or an alternative means of assuring continuous compliance with the substantive provisions of these EGS.

- c. Responsibility. Within every installation, the Environmental Protection Council, or equivalent, is responsible for establishing and implementing the installation auditing program.
- d. Frequency. The military departments and defense agencies will conduct external environmental compliance audits (i.e., utilizing personnel from a different installation or level of command) encompassing all applicable media at least once every three years or when directed by USCINCPAC. Each major installation will conduct an internal audit covering all applicable media program areas each calendar year (except in years when external audits are conducted).

1-12. ENVIRONMENTAL COMMITTEES/BOARDS.

- a. An Environmental Subcommittee has been established pursuant to Article XXVI of the US-ROK SOFA to undertake directed (Joint Committee) actions and make recommendations to the US-ROK SOFA Joint Committee on matters of mutual (i.e., U.S. and ROK) environmental concern pertaining to public health and sanitation. The Environmental Subcommittee shall follow procedures outlined in the Terms of Reference described in the minutes of the 173rd meeting (8 October 1993) of the Joint Committee. Environmental complaints to subordinate commands and installations shall be referred to the USFK ACofS, Engineer, who is the U.S. Component Chairman of the Environmental Subcommittee.
- b. The USFK Environmental Policy Board (EPB) has been established to assist the USFK Commander and subordinate commanders in all phases of environmental policy. The USFK EPB serves as an umbrella organization to oversee related USFK internal subcommittees. The Deputy Chief of Staff, USFK, serves as the Chairman of the USFK EPB.

1-13. COMPLAINT SYSTEM.

USFK installations, activities and staff officers will comply with the following procedures for responding to environmental inquiries and complaints from ROK authorities and other ROK entities:

- a. Within 14 calendar days following receipt of a ROK routine environmental inquiry or complaint, the activity/installation commander will respond to the complaint originator using the standard format at figure 1-1.
- b. When the commander responds to the routine inquiry/complaint, the same commander will provide the USFK ACofS, Engineer (through the chain of command) with a copy of the response and a written draft corrective action plan (if non-compliance has been suggested or alleged). The draft corrective action plan will describe resource impacts and include a time frame for resolving the perceived and actual environmental situations.
- c. The USFK ACofS, Engineer will coordinate with other appropriate USFK staff offices (as a minimum, with the U.S. SOFA Secretariat, Judge Advocate, Public Affairs Officer and Assistant Chief of Staff, Resource Management) to promptly respond to US-ROK SOFA Joint Committee taskings to the Environmental Subcommittee.

1-14. WAIVERS.

- a. Military activities and installations may seek a waiver or deviation from these EGS if compliance would:
 - (1) Seriously impair operations;
 - (2) Adversely affect relations with the ROK; or,
 - (3) Require substantial expenditure of funds not currently available for such purposes.

- b.* To obtain a waiver or deviation, activity or installation commanders shall first seek approval from their service component headquarters. If the headquarters concurs in the request, they will forward the request to the USFK ACofS, Engineer for action. USFK ACofS, Engineer will consult with the relevant military departments, defense agencies and USFK staff offices, U.S. Embassy (Seoul) on all requests. Installation commanders must keep files of their waiver correspondence, and the Environmental Programs Office (EPO), USFK ACofS, Engineer shall maintain a master file of all waivers and deviations granted and requested. Requests for waivers by USFK shall be referred to CDR PACOM.
- c.* USFK may, consistent with applicable international agreements and other laws, authorize temporary emergency waivers and deviations if the USFK Chief of Staff determines that such waivers are essential to accomplishment of an operational mission.
- d.* Under exigent circumstances, USFK ACofS, Engineer may grant temporary waivers or deviations, prior to consulting with relevant military departments and defense agencies, U.S. Embassy (Seoul) and CDR PACOM.
- e.* No waiver of treaty obligations may be granted under this process without prior coordination and approval by all treaty parties.
- f.* However, if the inquires and complaints have emergency nature or their potential impacts are beyond local concern, the activity/installation command will report to USFK ACofS, Engineer (EPO) as soon as possible for further guidance.

ORGANIZATION:

ADDRESSEE:

Dear (_____),

This letter is in response to your letter, dated (_____),
regarding (_____), at (_____).
Issues such as your request for information on (_____) are
best handled in accordance with the US-ROK Joint Committee procedures
[through the US-ROK Status of Forces Agreement (SOFA) process]. I
suggest that you send your request to the ROK component of the
Environmental Subcommittee, the Director of Policy Coordination at the ROK
Ministry of Environment (TEL: 02-500-4240).

I have forwarded your letter to the US SOFA Secretariat for information.
Should this issue be tabled by the US-ROK SOFA Joint Committee, I am
confident that the panel of environmental experts from both the US and the
ROK components of the Environmental Subcommittee will work to resolve
this issue to mutual satisfaction. The Environmental Programs Office, USFK
is available at phone 02-7915-3845 if you have any further questions.

Again, thank you for your concern,

Figure 1-1. USFK Standard Letter of Response to Environmental Complaints/Inquiries.

Chapter 2 AIR EMISSIONS

2-1. SCOPE

This chapter contains standards for air emissions sources operated by USFK in the ROK. Criteria addressing open burning of "Solid Waste" are contained in Chapter 7, and "Risk Management Plans" in Chapter 18.

2-2. DEFINITIONS.

- a. Additives. The chemical substances that either improve the performance of automobiles by adding a small quantity to fuel of the automobiles, or reduce the amount of exhaust from the automobiles.
- b. Air Pollutants. Gases, particulate matter, and offensive odor that cause air pollution and which are listed in Table 2-1.
- c. Coal Refuse. Waste products of coal mining, cleanings and coal preparation operations (e.g., culm, gob, etc.) containing coal, matrix material, clay, and other organic and inorganic material.
- d. Cold Cleaning Machine. Any device or piece of equipment that contains and/or uses liquid solvent, into which parts are placed to remove soils and other contaminants from the surfaces of the parts or to dry the parts. Cleaning machines that contain and use heated, nonboiling solvent to clean the parts are classified as cold cleaning machines.
- e. Dust. Particulate matter that floats, scatters, or descends in the air. The standards for dust reduction are listed in Table 2-8.
- f. Fossil Fuel. Natural gas, petroleum, coal, and any form of solid, liquid or gaseous fuel derived from such material for the purpose of creating useful heat.
- g. Freeboard Ratio. The ratio of the solvent cleaning machine freeboard height to the smaller interior dimension (length, width, or diameter) of the solvent cleaning machine.
- h. Gas. Gaseous substances generated during burning, synthesizing, and analyzing material, or generated by the physical properties of material itself. The permissible standards for gaseous pollutants are listed in Table 2-2.
- i. Incinerator. Any furnace used in the process of burning solid or liquid waste for the purpose of reducing the volume of the waste by removing combustible matter, including equipment with heat recovery systems for either hot water or steam generation.
- j. Motor Vehicle. Any commercially-available vehicle that is not adapted to military use which is self-propelled and designed for transporting persons or property on a street or highway, including but not limited to passenger cars, light duty vehicles, and heavy duty vehicles.
- k. New Source. Any facility/building, source or project with a construction start date on, or after, 1 October 1994, or a pre-existing facility that has been substantially modified since 1 October 1994.
- l. Offensive Odor. Unpleasant smell produced from hydrogen sulfide, mercaptans, amines, and other irritating gaseous substances. The permissible standards for offensive odor are listed in Table 2-3.
- m. Ozone-Depleting Substances (ODS). Those substances listed in Table 2-4.
- n. Particulate Matter. Minute solid or liquid particles of material which are generated by cutting, grading, heaping, reheaping, or any other mechanical treatment or by combustion, synthesis, decomposition of materials. The permissible standards for particulate pollutants are listed in Table 2-5.

- o. **Pathological Waste.** Waste material consisting of only human or animal remains, anatomical parts, and/or tissue, the bags/containers used to collect and transport the waste material, and animal bedding (if applicable).
- p. **Process Heater.** A device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.
- q. **Pyrolysis.** The endothermic gasification of materials, typically hospital waste and/or medical/infectious waste, using external energy.
- r. **Smoke.** Minute particles generated during combustion and mainly composed of free carbon.
- s. **Soot.** Particles with the diameter more than 1 micron that are condensed of free carbon produced at the time of combustion.
- t. **Specified Hazardous Air Pollutants.** Any air pollutant listed in Table 2-6 that is capable of posing a direct or indirect risk to public health and property, or to the growth of animals and plants.
- u. **Steam Generating Unit.** A device that combusts any fuel and produces steam or heats water or any other heat transfer medium. This definition does not include nuclear steam generators or process heaters.
- v. **Substantially-Modified.** Any modification to a facility/building the cost of which exceeds \$1 million, regardless of funding source.
- w. **Vapor Cleaning Machine.** A batch or in-line solvent cleaning machine that boils liquid solvent generating solvent vapor that is used as a part of the cleaning or drying cycle.
- x. **Wood Residue.** Bark, sawdust, slabs, chips, shavings, mill trim, and other wood products derived from wood processing and forest management operations.

2-3. CRITERIA

- a. **Steam/Hot Water Generating Units.**
 - (1) **Air Emission Standards for New or Substantially Modified (N/SM) Units.** The following criteria apply to N/SM units with a maximum design heat input capacity greater or equal to 10 million Btu/hr.
 - (a) N/SM steam/hot water generating units and associated emissions controls, if applicable, must be designed to meet the emission standards for specific sized units shown in Table 2-7 at all times, except during periods of start up, shut down, soot blowing, malfunction, or when emergency conditions exist.
 - (b) For N/SM units combusting liquid or solid fossil fuels, fuel sulfur content (weight percent) and higher heating value will be measured and recorded for each new shipment of fuel. Use this data to calculate sulfur dioxide (SO₂) emissions and document compliance with the SO₂ limits using the equation in Table 2-7. Alternatively, install a properly calibrated and maintained continuous emissions monitoring system to measure the flue gas for SO₂ and either oxygen (O₂) or carbon dioxide (CO₂).
 - (2) **Air Emissions Monitoring for N/SM Units.** N/SM steam/hot water generating units subject to opacity or NO_x standards in Table 2-7 must have a properly calibrated and maintained continuous emissions monitoring system (CEMS) to measure the flue gas as follows:
 - (a) For units with a maximum design heat input capacity greater than 30 million Btu/hr: Opacity, except that CEMS is not required where gaseous or distillate fuels are the only fuels combusted.
 - (b) For fossil-fuel fired units with a maximum design heat input capacity greater than 100 million Btu/hr: Nitrogen oxides (NO_x) and either oxygen (O₂) or carbon dioxide (CO₂).

- b. Incinerators. The following requirements do not apply to incinerators combusting hazardous waste, or munitions. Refer to Chapter 6 for information regarding hazardous waste disposal.
 - (1) Incinerators (Non-medical). All N/SM incinerators that have the capacity to burn more than 50 tons per day (tpd) must be designed to meet the following particulate standard: 0.18 grams per dry standard cubic meter (g/dscm) (0.08 grains per dry standard cubic foot (gr/dscf)) corrected to 12 percent CO₂.
 - (2) Sewage Sludge Incinerators. All N/SM sewage sludge incinerators that burn more than 1 tpd of sewage sludge or more than 10% sewage sludge must also be designed to meet a particulate emission limit of 0.65 g/kg dry sludge (1.30 lb/ton dry sludge) and an opacity limit of 20% at all times, except during periods of start up, shut down, malfunction, or when emergency conditions exist.
 - (3) Medical Waste Incinerators (MWI). The following standards apply to new and existing units. These requirements do not apply to any portable units (field deployable), pyrolysis units, or units that burn only pathological, low-level radioactive waste, or chemotherapeutic waste. These requirements also do not apply to fixed medical waste incinerators that exist only for contingency purposes and that burn only fuel during periodic testing. Existing sources must comply within five years of the publication date of this document. Refer to Chapter 8 for other requirements pertaining to medical waste management. All new and existing MWI must be designed and operated according to the following good combustion practices (GCP):
 - (a) Unit design: dual chamber
 - (b) Minimum temperature in primary chamber: 1400-1600°F.
 - (c) Minimum temperature in secondary chamber: 1800-2200°F.
 - (d) Minimum residence time in the secondary chamber: 2 seconds.
 - (e) Incinerator operators must be trained in accordance with applicable Service requirements.
- c. Perchloroethylene (PCE) Dry Cleaning Machines. The following requirements apply to new and existing dry cleaning machines. These requirements do not apply to coin-operated machines. Existing sources must comply within three years of the publication date of this document.
 - (1) Emissions from existing PCE dry cleaning machines, at installations that use more than 2000 gallons per year of PCE (installation wide) in their dry cleaning operations, must be controlled with a refrigerated condenser, or, if already installed, a carbon absorber. The temperature of the refrigerated condenser must be maintained at 45°F or less. Dry cleaning machines and control devices must be operated according to manufacturer recommendations.
 - (2) All new PCE dry cleaning systems must be of the dry-to-dry design with emissions controlled by a refrigerated condenser. The temperature of the refrigerated condenser must be maintained at 45°F or less. Dry cleaning machines and control devices must be operated according to manufacturer recommendations.
- d. Chromium Electroplating and Chromium Anodizing Tanks. The following standards apply to new and existing tanks. Existing sources must comply within three years of the publication date of this document.
 - (1) Ventilation exhaust from new and existing tanks must be controlled by a wet scrubber, composite mesh-pad eliminator, fiber bed filter, or equivalent control device capable of limiting emissions to 0.015 milligrams per dry standard cubic meter (mg/dscm). Control devices must be operated according to manufacturer recommendations.

- (2) Alternatively, in lieu of control devices, decorative chromium and chromium anodize tanks may use chemical tank additives to prevent the surface tension from exceeding 45 dynes per centimeter provided that the surface tension is monitored prior to the first initiation of electric current on a given day and every 4 hours thereafter.
- e. Halogenated Solvent Cleaning Machines. These requirements apply to new and existing solvent cleaning machines that use solvent which contains more than 5 percent by weight: methylene chloride (CAS No. 75-09-2), perchloroethylene (CAS No. 127-18-4), trichloroethylene (CAS No. 79-01-6), 1,1,1-trichloroethane (CAS No. 71-55-6), carbon tetrachloride (CAS No. 56-23-5), chloroform (CAS No. 67-66-3), or any combination of these halogenated solvents. Existing sources must comply within three years of the publication date of this document. (Note: 1,1,1-trichloroethane is an ozone depleting substance that will eventually be phased out of existence.)
 - (1) All cold cleaning machines (remote reservoir and immersion tanks) must be covered when not in use. Additionally immersion type cold cleaning machines must have either a 1" water layer or a freeboard ratio of at least 0.75.
 - (2) All vapor cleaning machines (vapor degreasers) must incorporate design and work practices that minimize the direct release of halogenated solvent to the atmosphere. Vapor degreasers had a deadline of 30 September 2003 to have incorporated systems that minimize the direct release of VOCs to the atmosphere including, for example, the use of covered or refrigerated systems.
- f. Units containing an Ozone Depleting Substance (ODS) Listed in Table 2-4. The following criteria apply to direct atmospheric emissions of ODS from refrigeration and fire suppression equipment.
 - (1) ODS Refrigerant Recovery/Recycling. All repairs or services to appliances, industrial process refrigeration units, air conditioning units, or motor vehicle air conditioners must be performed using commercially available refrigerant recovery/recycling equipment, operated by trained personnel.
 - (2) ODS Refrigerant Venting Prohibition. Do not intentionally release any class I or class II ODS refrigerant in the course of maintaining, servicing, repairing, or disposing of appliances, industrial process refrigeration units, air conditioning units, or motor vehicle air conditioners. De minimis releases associated with good faith attempts to recycle or recover ODS refrigerants are not subject to this prohibition.
 - (3) ODS Fire Suppression Agent (Halon) Venting Prohibition. Do not intentionally release halons into the environment while testing, maintaining, servicing, repairing, or disposing of halon-containing equipment or using such equipment for technician training. This venting prohibition does not apply to the following halon releases:
 - (a) De minimis releases associated with good faith attempts to recycle or recover halons (i.e., release of residual halon contained in fully discharged total flooding fire extinguishing systems);
 - (b) Emergency releases for the legitimate purpose of fire extinguishing, explosion inertion, or other emergency applications for which the equipment or systems were designed;
 - (c) Releases during the testing of fire extinguishing systems if each of the following is true: systems or equipment employing suitable alternative fire extinguishing agents are not available; release of extinguishing agent is essential to demonstrate equipment functionality; failure of system or equipment would pose great risk to human safety or the environment; and, a simulant agent cannot be used.
 - (d) Installations were to have developed and implemented plans to have eliminated Class I ODSs from facility applications by 30 September 2003.

- g.* Motor vehicles. These criteria apply to DoD-owned, non-tactical vehicles, and USFK-registered privately owned vehicles. Installations shall test vehicle emissions at least every two years to ensure compliance with the standards listed in Table 2-9, Permissible Standards for Motor Vehicle Emissions, Regular and Spot Inspections.

 - (1) Visually inspect all vehicles every two years to ensure that all factory-installed emission control equipment is intact and operational.
 - (2) Use only unleaded gasoline in vehicles that are designed to use unleaded gasoline.
 - (3) The standards for fuels are listed in Table 2-13 and 2-14.
 - (4) Vehicles will meet the relevant standards contained in table 2-9 according to the date of vehicle manufacture, or model year for vehicles from US automobile manufacturers. Tables 2-10 through 2-12 provide definitions of the vehicle types in Table 2-9.
- h.* Open burning. Open burning is permitted only for fire fighting and for infrequent vegetative debris management (see chapter 7). Installation fire protection supervisors may use open burning to train fire protection department employees to fight fires only in training facilities approved in writing by the installation commander. Fire protection department shall coordinate all fire training employing open burning with the local environmental office and accomplish the training in a manner such that it keeps environmental damage to a minimum. For example, only clean, uncontaminated lead-free fuels will be used. Open burning of hazardous material and HW, Petroleum, Oil, and Lubricants (POL), or trash is prohibited. This section does not prohibit the use of fireplaces and barbecues that are governed by installation-level directives.
- i.* Additional Criteria. Additional criteria for gaseous pollutants, particulate pollutants, offensive odors, dust reduction, and volatile organic compounds are provided in tables.

Table 2-1 List of Air Pollutants ?

1. particulate matter	27. aniline
2. bromine and its compounds	28. benzene
3. aluminum and its compounds	29. styrene
4. vanadium and its compounds	30. acrolein
5. manganese and its compounds	31. cadmium and its compounds
6. iron and its compounds	32. cyanides
7. zinc and its compounds	33. lead and its compounds
8. selenium and its compounds	34. chromium and its compounds
9. antimony and its compounds	35. arsenic and its compounds
10. tin and its compounds	36. mercury and its compounds
11. tellurium and its compounds	37. copper and its compounds
12. barium and its compounds	38. chlorine and its compounds
13. carbon monoxide	39. fluorides
14. ammonia	40. asbestos
15. nitrogen oxides	41. nickel and its compounds
16. sulfur oxides	42. vinyl chloride
17. hydrogen sulfide	43. 1,4-diethylene dioxide/ dioxin
18. dimethyl and methyl sulfide	44. phenol and its compounds
19. dimethyl disulfide	45. beryllium and its compounds
20. mercaptans	46. propylene oxide
21. amines	47. polychlorinated biphenyls
22. carbon tetrachloride	48. chloroform
23. carbon disulfide	49. formaldehyde
24. hydrocarbon	50. acetaldehyde
25. phosphorous and its compounds	51. benzidine
26. boron and its compounds	52. 1,3-butadiene

Table 2-2 Permissible Standards for Gaseous Pollutants		
Air Pollutant	Emission Facility	Effective from
		1 Jan 2005
Carbon Monoxide	Incinerators	
	1. Capacity of 2 t/hr or more	50(12)ppm
	2. Capacity between 2/hr and 200 kg/hr	200 (12)ppm
	3. Capacity less than 200 kg/hr	300(12)ppm
Hydrogen Chloride (HCl)	Incinerators	30 (12) ppm
	1. Capacity of 2 t/hr or more	
	2. Capacity between 2t/hr and 200 kg/hr	40 (12)ppm
	3. Capacity less than 200 kg/hr	50 (12) ppm
Sulfur dioxide	Incinerators	30(12)ppm
	1. Capacity of 2 t/hr or more	
	2. Capacity between 2/hr and 200 kg/hr	70 (12)ppm
	3. Capacity less than 200 kg/hr	100(12)ppm
Nitrogen oxide as NO ₂	Incinerators	80(12)ppm
	1. Capacity of 2 t/hr or more	
	2. Capacity between 2/hr and 200 kg/hr	150 (12)ppm
	3. Capacity less than 200 kg/hr	150(12)ppm
Fluoride compounds as F	Incinerators	2(12)ppm
	1. Capacity of 2 t/hr or more	
	2. Capacity between 2/hr and 200 kg/hr	2 (12)ppm
	3. Capacity less than 200 kg/hr	3 (12)ppm

Remarks:

- Numbers in () show the % of standard oxygen density (% of O₂)
- For incinerators, other permissible standards are:
 - Mercury compounds as Hg: 0.1 mg/m³
 - Arsenic compounds as As: 0.5 mg/l
 - Chlorine: 10 mg/l
 - Hydrogen Cyanide: 10 mg/l
 - Bromide compounds as Br: 5 ppm
 - Benzene compounds as benzene: 30 ppm
 - Phenol compounds as phenol: 10 ppm

Table 2-3 Permissible Standards for Offensive Odors		
Measurement method	Permissible emission standards	
Undiluted olfactory method	Less than 2 degrees of offensive odor	
Air-diluted Olfactory method	a. at the emission point: dilution ratio ≤ 500 b. at the facility boundary: dilution ratio ≤ 15	
Analytical Instrumentation method	Odor-causing matter	Other regions
	Ammonia	≤ 1 ppm
	Methyl mercaptans	≤ 0.002 ppm
	Hydrogen sulfide	≤ 0.02 ppm
	Dimethyl sulfide	≤ 0.01 ppm
	Dimethyl dulfide	≤ 0.009 ppm
	Trimethyl amines	≤ 0.005 ppm
	Acetaldehyde	≤ 0.05 ppm
	Styrene	≤ 0.4 ppm

Table 2-4 Class I and II Ozone Depleting Substances			
Class I			
CFC – 11	CFC - 114	CFC - 215	Halon - 1211
CFC – 12	CFC - 115	CFC - 216	Halon - 1301
CFC – 13	CFC - 211	CFC - 217	Halon - 2402
CFC – 111	CFC - 212	CFC - 500	Carbon Tetrachloride
CFC – 112	CFC - 213	CFC - 502	Methyl Chloroform
CFC – 113	CFC - 214	CFC - 503	Methyl Bromide
Class II			
HCFC – 21	HCFC - 133	HCFC - 226	HCFC - 243
HCFC – 22	HCFC – 141(b)	HCFC - 231	HCFC - 244
HCFC – 31	HCFC – 142(b)	HCFC - 232	HCFC - 251
HCFC – 121	HCFC - 221	HCFC - 233	HCFC - 252
HCFC – 122	HCFC - 222	HCFC - 234	HCFC - 253
HCFC – 123	HCFC - 223	HCFC - 235	HCFC - 261
HCFC – 124	HCFC - 224	HCFC - 241	HCFC - 262
HCFC – 131	HCFC - 225	HCFC - 242	HCFC - 271
HCFC – 132			

Table 2-5 Permissible Standards for Particulate Pollutants?		
Pollutants	Emission Facility	Phase in Periods
		After 1 Jan 2005
Dust	Incinerators or incinerating boilers	
	1. Capacity of 2 t/hr or more	30 (12) mg/sm ³
	2. Capacity between 2 t/hr and 200 kg/hr	80 (12) mg/sm ³
	3. Capacity of less 200 kg/hr	100 (12) mg/sm ³
Cadmium as Cd	Incinerators	
	1. Capacity of 2 t/hr or more	0.02 (12) mg/Sm ³
	2. Capacity between 2 t/hr and 200 kg/hr	0.1 (12) mg/m ³
	3. Capacity less than 200 kg/hr	0.2 (12) mg/Sm ³
Lead as Pb	Incinerators	
	1. Capacity of 2 t/hr or more	0.2 (12) mg/Sm ³
	2. Capacity between 2 t/hr and 200 kg/hr	1.6 (12) mg/m ³
	3. Capacity less than 200 kg/hr	5 (12) mg/Sm ³

Remarks:

- Numbers in () refer to the percentage of standard oxygen concentration (% of O₂).
- Additional standards are:
 - Cr: 0.5 (12) mg/Sm³
 - Cu: 10 mg/Sm³
 - Ni: 20 mg/Sm³
 - Zn: 10 mg/Sm³
 - Flying dust: 0.5 mg/Sm³
 - Smoke: 2 degree

Table 2-6 List of Specified Hazardous Air Pollutants	
1. cadmium and its compounds	14. 1,4-diethylene dioxide (dioxin)
2. cyanides	15. phenol and its compounds
3. lead and its compounds	16. beryllium and its compounds
4. polychlorinated biphenyls	17. benzene
5. chromium and its compounds	18. carbon tetrachloride
6. arsenic and its compounds	19. methyl/dimethyl disulfide
7. mercury and its compounds	20. aniline
8. propylene oxides	21. chloroform
9. chlorine and hydrogen chloride	22. formaldehyde
10. fluorides	23. acetaldehyde
11. asbestos	24. benzidine
12. nickel and its compounds	25. 1,3-butadiene
13. vinyl chloride	

Table 2-7 Emission Standards for N/SM Steam Generating Units^a

Fuel Type	Maximum Design Heat Input Capacity						
	10 – 100 million BTU/hr			Size >100 million BTU/hr			
	PM	Opacity ^b	SO ₂ ^c	PM	Opacity ^b	SO ₂ ^c	NO _x ^d
Gaseous	N/A	N/A	N/A	N/A	N/A	N/A	0.20
Gaseous - Coal Derived	N/A	N/A	N/A	N/A	N/A	N/A	0.50
Liquid Fossil Fuel	N/A	20%	0.50 ^e	0.10	20%	0.80	0.30
Solid Fossil Fuel	0.10	20%	1.20	0.10	20%	1.20	0.70
Other Solid Fuel ^f	0.30	20%	N/A	0.20	20%	N/A	N/A

N/A = Not applicable.

^a. Standards do not apply during periods of startup, shutdown, malfunction, soot blowing, or when emergency conditions exist. Unless specified otherwise, emission standards are in lb/million BTU.

^b. The opacity standards do not apply to units < 30 million BTU/hr. The 20% standard applies to the average opacity over a six-minute period. A 30% opacity value is allowed for one six-minute period per hour.

^c. SO₂ is best controlled and compliance documented by limiting fuel sulfur content.

SO₂ emissions (lb/ million BTU) = 0.02 X sulfur content of fuel (%) / heat content of fuel (HHV, million BTU/lb fuel).

[E.g., for fuel oil with 0.5% sulfur, SO₂ = 0.02 X 0.5 / 0.019 = 0.53 lb/million BTU.]

^d. Emission limitation for NO_x is based on a 30-day rolling average. NO_x standard does not apply when a fossil fuel containing at least 25% by weight of coal refuse is burned in combination with gaseous, liquid, or other solid fossil fuel.

^e. Instead of 0.5 lb/ million BTU of SO₂, fuel oil combustion units may comply with a 0.5% average fuel sulfur content limit (weight percent) which is statistically equivalent to 0.5 lb/million BTU.

^f. Other solid fuels include wood or waste derived fuels.

Table 2-8 Dust Reduction Facility: Standards for Installation & Necessary Measures	
Discharge process	Standards for installation & necessary measures
1. Field storage (when powdery material is stored in the field)	<ul style="list-style-type: none"> a. Field stored material shall be covered by anti-dust cover b. Anti-dust cover wall of 1/3 of field storage height shall be installed and anti-dust net (screen) of 1.25 times the height of storage shall be installed. For construction site, landscaping site, and demolition site, the boundary shall be guarded with anti-dust wall of 1.8m or more. When two or more sites are adjacent to each other, the inner boundary does not need a wall. c. Field stored material shall have water content of 7-10% and sprinkler shall be installed to maintain the water content. (For iron scrap site, this does not apply) d. When the same measures equivalent to or better than a.-c. are taken, those measure can substitute a.-c.

Table 2-9 Permissible Standards for Motor Vehicle Emissions, regular and spot inspections.

Type of Fuel	Vehicle Age	Type of Vehicle	Vehicle Age	Carbon Monoxide	Hydrocarbon	Smoke	Excessive air
Gasoline, Gas, Alcohol	US Model Year 2000 and earlier Or Others manufactured before 31 Dec 2000	Light car	Before 31 December 1997	4.5 % or less	1,200 ppm or less	-	Less than 1±0.1. However, vehicle with carburetor air supply unit attached is less than 1±0.15, less than 1±0.2 for vehicle without catalyst.
			From 1 January 1998 to 31 December 2000	2.5 % or less	400 ppm or less		
		Passenger car	Before 31 December 1987	4.5 % or less	1,200 ppm or less	-	
			From 1 January 1988 to 31 December 2000	1.2 % or less	220 ppm or less (gasoline, alcohol) 400 ppm or less (gas)		
		Small freight, Heavy vehicle		4.5 % or less	1,200 ppm or less	-	
	US Model Years 2001-2002 Or Others manufactured between 1 Jan 01 and 30 Jun 02	Light car		1.2 % or less	220 ppm or less	-	
		Passenger car		1.2 % or less	220 ppm or less	-	
		Multipurpose car		2.5 % or less	400 ppm or less	-	
		Medium size car, Large size car		4.5 % or less	1,200 ppm or less	-	
	US Model Years 2003 and later Or Others manufactured after 1 Jul 02	Light car		1.2 % or less	220 ppm or less	-	
		Passenger car 1, passenger car 2		1.2 % or less	220 ppm or less	-	
		Passenger car 3, Passenger car 4, Freight		2.5 % or less	400 ppm or less	-	
Diesel	US Model Year 2000 and earlier Or Others manufactured before 31 Dec 2000	Passenger car, Small freight car	US Model Year 1995 and earlier Or Others manufactured before 31 Dec 1995	-	-	40% (2 degrees) or less	
			US Model Years 1996-2000 Or Others manufactured between 1 Jan 96 and 31 Dec 00	-	-	35% (2 degrees) or less	

Table 2-9 Permissible Standards for Motor Vehicle Emissions, regular and spot inspections.

Type of Fuel	Vehicle Age	Type of Vehicle	Vehicle Age	Carbon Monoxide	Hydrocarbon	Smoke	Excessive air
Diesel	US Model Year 2000 and earlier <u>Or</u> Others manufactured before 31 Dec 2000	Heavy vehicle	US Model Year 1992 and earlier <u>Or</u> Others manufactured before 31 Dec 1992	-	-	40% (2 degrees) or less	
			US Model Years 1993-1995 <u>Or</u> Others manufactured between 1 Jan 93 and 31 Dec 95	-	-	35% (2 degrees) or less	
			US Model Years 1996-2000 <u>Or</u> Others manufactured between 1 Jan 96 and 31 Dec 00	-	-	30% (2 degrees) or less	
	US Model Years 2001-2002 <u>Or</u> Others manufactured between 1 Jan 01 and 30 Jun 02	Passenger car, Multipurpose car, Medium size car		-	-	30 % (2 degrees) or less	
		Large size car		-	-	25 % (2 degrees) or less	
	US Model Years 2003 and later <u>Or</u> Others manufactured after 1 Jul 02	Passenger car 1, Passenger car 2, Passenger car 3, Freight 1, Freight 2		-	-	25% (2 degrees) or less	
		Passenger car 4, Freight 3		-	-	20% (2 degrees) or less	

Remarks:

1. Gasoline vehicles include those using gasoline, alcohol, and LPG mixture fuel.
2. For vehicles using alcohol, the hydrocarbon standard does not apply.
3. Diesel vehicles include those using diesel and gas mixture fuel.
4. For US Model Year 2000 and earlier or Others manufactured before 31 Dec 2000, multipurpose passenger cars and minivans with seating capacity of eight passengers or fewer, which use gasoline or gas fuel shall follow the standards for small freight cars.
5. In "smoke" column, standards within parentheses "()" shall be applied when a video camera is used.

6. For a diesel-fueled vehicle with a turbocharger or intercooler and, US Model Year 1998 later or Others manufactured after 31 Dec 2000, the permissible emission standards for the “smoke” item shall increased by 5 % to the listed value.

Table 2-10. Definitions of the types of vehicles described in Table 2-5 for US Model Year 2000 and earlier <u>or</u> Others manufactured before 31 Dec 2000		
Kind	Definition	Size
Light car	Those manufactured to be suitable usually for transporting a small number of people or a small amount of freight	Engine displacement of less than 800cc.
Passenger car	Those manufactured to be suitable usually for transporting people	Engine displacement of 800cc or more, vehicle gross weight of less than 2.5 tons.
Small truck	Those manufactured to be suitable usually for transporting freight	Engine displacement of 800cc or more, vehicle gross weight of less than 3.5 tons.
Heavy-duty vehicle	Those manufactured to be suitable usually for transporting a large number of people or a large amount of freight	Vehicle gross weight of less than 3.5 tons
Two-wheeled vehicle	Those manufactured to be suitable usually for transporting one or two people	Vehicle unloaded weight of less than 0.5 tons.

Table 2-11. Definitions of the types of vehicles described in Table 2-5 for US Model Years 2001-2002 <u>or</u> Others manufactured between 1 Jan 01 and 30 Jun 02		
Kind	Definition	Size
Lightweight vehicle	Those manufactured to be suitable usually for transporting a small number of people or a small amount of freight	Engine displacement of less than 800cc.
Passenger car	Those manufactured to be suitable usually for transporting people	Engine displacement of 800cc or more, vehicle gross weight of less than 2.5 tons.
Multi-purpose vehicle	Those manufactured to be suitable for transporting people and other various purposes	Engine displacement of 800cc or more, vehicle gross weight of less than 2.5 tons.
Mid-sized vehicle	Those manufactured to be suitable for transporting people and freight	Engine displacement of 800cc or more, vehicle gross weight of less than 3.5 tons.
Large-sized vehicle	Those manufactured to be suitable usually for transporting a large number of people or a large amount of freight	Vehicle gross weight less than 3.5 tons
Two-wheeled vehicle	Those manufactured to be suitable usually for transporting one or two people	Vehicle unloaded weight of less than 0.5 tons.

Table 2-12. Definitions of the types of vehicles described in Table 2-5 for US Model Years 2003 and later or Others manufactured after 1 Jul 02.

Kind	Definition	Size	
Light car	Those manufactured to be suitable usually for transporting a small number of people or a small amount of freight	Engine displacement of less than 800cc.	
Passenger car	Those manufactured to be suitable usually for transporting people	Passenger car 1	Engine displacement of 800cc or more, vehicle gross weight of less than 3.5 tons, seating capacity of 8 passengers or fewer, width of less than 2,000 mm and height of less than 1,880 mm
		Passenger car 2	Multi-purpose type passenger cars with engine displacement of 800cc or more, vehicle gross weight of less than 3.5 tons
		Passenger car 3	Engine displacement of 800cc or more, vehicle gross weight of less than 3.5 tons, and seating capacity of 15 or fewer (excludes passenger car 1)
		Passenger car 4	Gross weight of 3.5 tons or greater
Freight vehicle	Those manufactured to be suitable for transporting freight	Freight 1	Engine displacement of 800cc or more and gross weight of less than 2 tons
		Freight 2	Engine displacement of 800cc or more, gross weight of greater than 2 tons and of 3.5 tons or less
		Freight 3	Gross weight of greater than 3.5 tons
Two-wheeled vehicle	Those manufactured to be suitable for transporting usually one or two people	Vehicle unloaded weight of 0.5 ton or less.	

Remarks:

1. Passenger cars and multipurpose cars include multipurpose cars and minivans with seating capacity of eight passengers or fewer (with less than 2,000 mm width, less than 1,800 mm height).
2. Small trucks include minivans with 800cc or greater displacement and passenger vehicles with seating capacity of nine passengers or more that do not fall under the passenger category.
3. Heavy-duty vehicles and large-sized vehicles include construction machinery such as dump trucks, concrete mixers, and concrete pump trucks.
4. Mid-sized vehicles include passenger cars, passenger vehicles (other than multipurpose cars) with seating capacity of 15 passengers or fewer and minivans with 800cc or greater displacement.
5. Freight 2 includes vans with 800cc or greater displacement engine.

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6. Freight 3 includes construction machinery such as dump trucks, concrete mixers and concrete pump trucks.
7. Two-wheeled vehicles include a two-wheeler that can be attached to the side of a vehicle, but exclude light cars, passenger cars, and small trucks.
8. Two-wheeled vehicles with less than a 50 cc engine are limited to a scooter type or moped type.

Table 2-13. Standards of Fuel for Gasoline Vehicles	
Standard Items/ Application period	After 30 September 2004
Aromatic Chemical (% v/v)	< 35
Benzene (% v/v)	< 2
Pb (g/L)	< 0.013
P (g/L)	< 0.0013
O ₂ (% w/w)	1.3 < O ₂ < 3
Olefin (% w/w)	< 23
S (ppm)	< 200
Vapor pressure (kPa, 37.8°C)	< 82
90% flow temp. (Celsius)	< 175

Remarks:

1. Standard for vapor pressure shall be applied to the products that come out from 1 April to 31 October every year.
2. The oxygen content standard of the product delivered between April 1 and October 31 of every year shall be 2.3 or less.

Table 2-14. Standards of Fuel for Diesel Vehicles	
Standard Items/ Application Period	After 30 September 2004
10% Residual Carbon (%)	<0.15
S (% w/w)	<0.05

Chapter 3 DRINKING WATER

3-1. SCOPE.

This chapter contains criteria for providing potable water at USFK installations.

3-2. DEFINITIONS.

- a. **Action Level.** The concentration of a substance in water that establishes appropriate treatment for a water system.
- b. **Appropriate DoD Medical Authority.** The medical professional designated by the in-theater component commander to be responsible for resolving medical issues necessary to provide safe drinking water at the component's installations.
- c. **Community Water System (CWS).** A public water system having at least 15 service connections used by year-round residents, or which regularly serves at least 25 year-round residents.
- d. **Concentration/Time (CT).** The product of residual disinfectant concentration, C, in mg/L determined before or at the first customer, and the corresponding disinfectant contact time, T, in minutes. CT values appear in tables 3-11-1.1 to 3-11-1.6, 3-11-2, and 3-11-3.
- e. **Conventional Treatment.** Water treatment including chemical coagulation, flocculation, sedimentation, and filtration.
- f. **Diatomaceous Earth Filtration.** A water treatment process of passing water through a precoat of diatomaceous earth deposited on a support membrane while additional diatomaceous earth is continuously added to the feed water to maintain the permeability of the precoat, resulting in substantial particulate removal from the water.
- g. **Direct Filtration.** Water treatment including chemical coagulation, possibly flocculation, and filtration, but not sedimentation.
- h. **Disinfectant.** Any oxidant, including but not limited to, chlorine, chlorine dioxide, chloramines, and ozone, intended to kill or inactivate pathogenic microorganisms in water.
- i. **Emergency Assessment.** An evaluation of the susceptibility of the water source, treatment, storage and distribution system(s) to disruption of service from natural disasters, accidents and sabotage.
- j. **First Draw Sample.** A one-liter sample of tap water that has been standing in plumbing at least six hours and is collected without flushing the tap.
- k. **Follow-up lead and copper monitoring.** Two consecutive six-month monitoring periods for water systems that do not comply with the lead or copper action levels. Monitoring will consist of lead/copper tap samples and water quality parameters (WQPs). This sampling cycle will continue until the system demonstrates compliance with both of the lead and copper action levels.
- l. **Groundwater Under the Direct Influence of Surface Water (GWUDISW).** Any water below the surface of the ground with significant occurrence of insects or other microorganisms, algae, or large diameter pathogens such as *Giardia lamblia*; or significant and relatively rapid shifts in water characteristics, such as turbidity, temperature, conductivity, or pH, which closely correlate to climatological or surface water conditions.
- m. **Initial lead and copper monitoring.** Two consecutive six-month monitoring periods for first-draw samples for lead and copper.
- n. **Lead-free.** A maximum lead content of 0.2 % for solder and flux, and 8.0 % for pipes and fittings.

- o. **Lead Service Line.** A service line made of lead that connects the water main to the building inlet, and any lead pigtail, gooseneck, or other fitting that is connected to such line.
- p. **Maximum Contaminant Level (MCL).** The maximum permissible level of a contaminant in water that is delivered to the free-flowing outlet of the ultimate user of a public water system except for turbidity for which the maximum permissible level is measured after filtration. Contaminants added to the water under circumstances controlled by the user, except those resulting from the corrosion of piping and plumbing caused by water quality, are excluded.
- q. **Non-Public Water System (NPWS).** A system that does not meet the definition of a public water system; for example, a well serving a building with less than 25 people.
- r. **Non-transient non-community (NTNC) water system.** A public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year.
- s. **Point-of-Entry (POE) Treatment Device.** A treatment device applied to the drinking water entering a facility to reduce contaminants in drinking water throughout the facility.
- t. **Point-of-Use (POU) Treatment Device.** A treatment device applied to a tap to reduce contaminants in drinking water flowing from that tap.
- u. **Potable Water.** Water that has been examined and treated to meet the standards in this chapter, and has been approved as potable by the appropriate DoD medical authority.
- v. **Public Water System (PWS).** A system for providing piped water to the public for human consumption, if such system has at least 15 service connections or regularly serves at least 25 individuals year-round. Such term includes both "community water systems" that serve year-round residents and "non-community systems" along with any collection, treatment, storage, and distribution facilities under control of the operator of such systems, and any collection or pretreatment storage facilities not under such control that are used primarily in connection with such systems. A non-community system is used by intermittent users or travelers and is sub-classified into a non-transient, non-community or NTNC system and a transient, non-community or TNC system. A NTNC system could be a school or factory with its own water supply where the same people drink the water throughout the year, but not 24-hours a day. A TNC system example is a motel with its own well.
- w. **Reduced lead and copper monitoring.** The reduction of both the number of samples and the frequency of monitoring required for those water systems that have demonstrated consistent compliance with the lead and copper action levels during 2 consecutive 6-month monitoring periods. An installation commander must obtain approval for reduced monitoring by submitting a request, in writing, to the USFK ACofS, Engineer. The USFK ACofS, Engineer is responsible for determining if a water system qualifies for reduced monitoring. Reduced lead monitoring will consist of lead/copper tap samples and WQPs. This monitoring will be conducted annually for three consecutive years during the months of June, July, August, or September.
- x. **Sanitary Survey.** An on-site review of the water source, treatment facilities, equipment, operation and maintenance of a public water system to evaluate the adequacy of such elements for producing and distributing potable water.
- y. **Slow Sand Filtration.** Water treatment process where raw water passes through a bed of sand at a low velocity (1.2 ft/hr), resulting in particulate removal by physical and biological mechanisms.
- z. **Total Trihalomethanes.** The sum of the concentration in mg/L of chloroform, bromoform, dibromochloromethane, and bromodichloromethane.

- aa. **Transient non-community (TNC) water system.** A public, non-community water system that does not regularly serve at least 25 of the same persons at least six months out of the year.
- bb. **Ultimate reduced lead monitoring.** The lowest reduction in monitoring frequency allowed for systems that demonstrate compliance with the lead and copper action levels during all 3 consecutive annual sampling events conducted under the reduced monitoring schedule. Monitoring will consist of lead/copper tap samples and WQPs. Monitoring will be conducted once every 3 years during the months of June, July, August, or September.
- cc. **Underground Injection.** A subsurface emplacement through a bored, drilled, driven or dug well where the depth is greater than the largest surface dimension, whenever a principle function of the well is the emplacement of any fluid.
- dd. **USFK Water System.** A public water system or non-public water system.
- ee. **Vulnerability Assessment.** An evaluation by USFK or a representative designated by the Component Command which shows that contaminants of concern either have not been used in a watershed area or the source of water for the system is not susceptible to contamination. Susceptibility is based on prior occurrence, vulnerability assessment results, environmental persistence and transport of the contaminants, and any wellhead protection program results.
- ff. **Water system.** Refers to both a PWS and an NPWS, and purchasers who have a distribution system and water storage facilities.

3-3. CRITERIA.

- a. USFK water systems, regardless of whether they produce or purchase water, will:
 - (1) Maintain a map/drawing of the complete potable water system.
 - (2) Update the potable water system master plan at least every five years.
 - (3) Protect all water supply aquifers (groundwater) and surface water sources from contamination by suitable placement and construction of wells, by suitable placement of any new intakes (heading) to all water treatment facilities, proper siting and maintenance of septic systems and on-site treatment units, and by appropriate land use management on USFK installations.
 - (4) Conduct sanitary surveys of the water system at least once every 3 years for systems using surface water or GWUDISW, and every 5 years for systems using ground water, or over shorter intervals as warranted, including review of required water quality analyses. Off-installation surveys will be coordinated with ROK authorities.
 - (5) Provide proper treatment for all potable water sources. Surface water supplies, including GWUDISW, must conform to the surface water treatment requirements set forth in table 3-1. Groundwater supplies, as a minimum, must be disinfected.
 - (6) Maintain a continuous positive pressure of at least 20 psi in the water distribution system.
 - (7) Perform water distribution system operation and maintenance practices consisting of:
 - (a) Maintenance of a disinfectant residual throughout the water distribution system (except where determined unnecessary by the appropriate DoD medical authority);
 - (b) Proper procedures for repair and replacement of mains (including disinfection and bacteriological testing);
 - (c) An effective annual water main flushing program;
 - (d) Proper operation and maintenance of storage tanks and reservoirs; and

- (e) Maintenance of distribution system appurtenances (including hydrants and valves).
 - (8) Establish an effective cross connection control and backflow prevention program.
 - (9) Manage underground injection on USFK installations to protect underground water supply sources. At a minimum, conduct monitoring to determine the effects of any underground injection wells on nearby groundwater supplies.
 - (10) Develop and update as necessary an emergency contingency plan to ensure the provision of potable water despite interruptions from natural disasters and service interruptions. As needed to meet potable water source requirements, an installation commander shall request, through the USFK ACofS, Engineer (FKEN-TMP), access to municipal potable water supplies under the provisions of Article VI, U.S.-ROK SOFA. At a minimum, the emergency contingency plan will include:
 - (a) Identification of key personnel;
 - (b) Procedures to restore service;
 - (c) Procedures to isolate damaged lines;
 - (d) Identification of alternative water supplies;
 - (e) Installation public notification procedures; and
 - (f) Emergency assessment.
 - (11) Use only lead-free pipe, solder, flux, and fittings in the installation or repair of water systems and plumbing systems for drinking water. If drinking water at a USFK water system contains elevated lead levels as defined in paragraph 3-3b(4) and table 3-6, the installation commander shall notify the public on the lead content of materials used in distribution or plumbing systems; on the corrosivity of the water that has caused leaching, if applicable; and on remedial actions planned to reduce the health risks.
 - (12) Maintain records showing monthly operating reports for at least 3 years, and records of bacteriological results for not less than 5 years, and chemical results for not less than 10 years.
 - (13) Document corrective actions taken to correct breaches of criteria and maintain such records for at least three years. Cross-connection and backflow prevention testing and repair records should be kept for at least 10 years.
 - (14) Conduct vulnerability assessments prior to requesting waivers for any organic or inorganic compound monitoring frequency criteria cited in this chapter and provide a copy of the report to USFK Engineer.
- b. The USFK water systems, regardless of whether they produce or purchase water, will complete, by independent testing, in compliance with U.S. EPA test methods and protocols, testing to ensure conformance with the following:
- (1) Total coliform bacteria requirements.
 - (a) An installation responsible for a PWS will conduct a bacteriological monitoring program to ensure the safety of water provided for human consumption and allow evaluation with the total coliform-related MCL. The MCL is based only on the presence or absence of total coliforms. The MCL is no more than 5% positive samples per month for a system examining 40 or more samples a month, and no more than one positive sample per month when a system analyzes less than 40 samples per month. Further, the MCL is exceeded whenever a routine sample is positive for fecal coliforms or E. coli or any repeat sample is positive for total coliforms.
 - (b) Each system must develop a written, site-specific monitoring plan and collect routine samples according to table 3-2. "Total Coliform Monitoring Frequency."
 - (c) Systems with initial samples testing positive for total coliforms will collect repeat samples as soon as possible, preferably the same day. A system that collects

more than one routine sample per month must collect no fewer than three repeat samples for each total coliform-positive sample found. Repeat sample locations are required at the same tap as the original sample plus an upstream and downstream sample each collected within 5 service connections of the original service connection. Any additional repeat sampling that may be required will be performed according to local medical or USFK, ACoS Engineer guidance. Monitoring will continue until total coliforms are no longer detected.

- (d) When any routine or repeat sample tests positive for total coliforms, it will be tested for fecal coliform or E. Coli. Fecal-type testing can be foregone on a total coliforms-positive sample if fecal or E.coli is assumed to be present.
 - (e) Any fecal coliform-positive repeat sample or E. Coli-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or E. Coli-positive routine sample constitutes a violation of the MCL for total coliforms. If a system has exceeded this MCL, the installation will complete the notification in paragraph 3-3c no later than the end of the next business day that an acute risk to public health may exist. The installation will complete notification to the appropriate Installation Medical Authority as soon as possible, but in no case later than the end of the same day the command responsible for operating the PWS is notified of the result.
 - (f) Each PWS must also comply with the following MCL: No more than 5 percent total coliform positive samples per month for a system examining 40 or more samples a month, and no more than one total coliform positive sample per month when a system analyzes less than 40 samples per month. If a system is out of compliance, the installation will complete the notification in paragraph 3-3c as soon as possible, but in no case later than 14 days after the condition.
 - (g) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliforms. Repeat samples taken pursuant to paragraph 3-3b (1) (c) above, of this chapter, are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliforms.
- (2) Inorganic chemical requirements.
- (a) An installation responsible for a PWS will ensure that the inorganic chemicals in water distributed to consumers do not exceed the limitations set out in table 3-3.
 - (b) Systems will be monitored for inorganic chemicals at the frequency set in table 3-4.
 - (c) Except for nitrate, nitrite and total nitrate/nitrite, for systems monitored quarterly or more frequently, a system is out of compliance if the annual running average concentration of an inorganic chemical exceeds the MCL. For systems monitored annually or less frequently, a system is out of compliance if a single sample exceeds the MCL. For nitrate, nitrite and total nitrate/nitrite, system compliance is determined by averaging the single sample that exceeds the MCL with its confirmation sample; if the average exceeds the MCL, the system is out of compliance.
 - (d) If a system is out of compliance, the installation will complete the notification in paragraph 3-3c as soon as possible. If the nitrate, nitrite or total nitrate/nitrite MCL is exceeded then this is considered an acute health risk and the installation will complete notification to:

1. The appropriate installation medical authority as soon as possible, but in no case later than the end of the same day the command responsible for operating the PWS is notified of the result.
2. The installation public as soon as possible, but not later than 72 hours after the system is notified of the test result.
- (e) If the installation is only monitoring annually on the basis of a waiver, it will immediately increase monitoring IAW table 3-4 until authorities determine the system is reliably and consistently below the MCL and remedial actions completed.
- (3) Fluoride requirements.
 - (a) An installation responsible for a CWS will ensure that the fluoride content of drinking water does not exceed the MCL of 4.0 mg/L stated in table 3-3, "Inorganic Chemical MCLs."
 - (b) Systems will be monitored for fluoride by collecting one treated water sample at the entry point to the distribution system annually for surface water systems and once every three years for groundwater systems. Daily monitoring is recommended for systems practicing fluoridation using the criteria in table 3-5, "Recommended Fluoride Concentrations at Different Temperatures."
 - (c) If any sample exceeds the MCL, the installation will complete the notification in paragraph 3-3c as soon as possible, but in no case later than 14 days after the violation.
- (4) Lead and copper requirements.
 - (a) An installation responsible for a CWS or a NTNC water system will ensure that the system complies with action levels of 0.015 mg/L for lead and 1.3 mg/L for copper to determine if corrosion control treatment, public education, and removal of lead service lines, if appropriate, are required. Actions are triggered if the respective lead and copper levels are exceeded in more than 10 percent of all sampled taps.
 - (b) Affected USFK systems will conduct monitoring in accordance with table 3-6. High risk sampling sites will be targeted by conducting a materials evaluation of the distribution system. Sampling sites will be selected as stated in table 3-6.
 - (c) If an action level is exceeded, the installation will collect additional water quality samples specified in table 3-6. Optimal corrosion control treatment will be pursued. If action levels are exceeded after implementation of applicable corrosion control and source water substitution or treatment, lead service lines will be replaced if the lead service lines cause the lead action level to be exceeded. The installation commander will implement an education program for installation personnel (including U.S. and ROK) within 60 days and will complete the notification in paragraph 3-3c as soon as possible, but in no case later than 14 days after the violation.
- (5) Synthetic organics requirements.
 - (a) An installation Commander responsible for a CWS or a NTNC water system will ensure that synthetic organic chemicals in water distributed to people do not exceed the limitations delineated in table 3-7. For systems monitored quarterly or more frequently, a system is out of compliance if the annual running average concentration of an organic chemical exceeds the MCL. For systems monitored annually or less frequently, that system is out of compliance if a single sample exceeds the MCL.
 - (b) Systems will be monitored for synthetic organic chemicals according to the schedule stated in table 3-8.

- (c) If a system is out of compliance, the installation will complete the notification in paragraph 3-3c as soon as possible, but in no case later than 14 days after the violation. The installation immediately will begin quarterly monitoring if the level of any contaminant is detected above its detection limit but below its MCL as noted in table 3-8, and will continue until the installation commander determines the system is reliably and consistently below the MCL, and any necessary remedial measures are implemented.
- (6) Total trihalomethanes requirements.
 - (a) An installation Commander responsible for a CWS or an NTNC water system that adds a disinfectant (oxidant, such as chlorine, chlorine dioxide, or chloramines) to any part of its treatment process will ensure that the MCL of 0.10 mg/L for total trihalomethanes is met in drinking water. A system is out of compliance when the annual running average of the average of all sample sites exceeds the MCL.
 - (b) Such systems that add a disinfectant will monitor total trihalomethanes in accordance with table 3-9.
 - (c) If a system is out of compliance, the installation will complete the notification in paragraph 3-3c as soon as possible, but in no case later than 14 days after the violation, and undertake remedial measures.
- (7) Radionuclide requirements.
 - (a) An installation responsible for a CWS or a NTNC water system will test the system for conformance with the applicable radionuclide limits contained in table 3-10.
 - (b) Systems will perform radionuclide monitoring as stated in table 3-10.
 - (c) If the average annual concentration for gross alpha activity, total radium, or gross beta exceeds the MCL the installation will inform the on-post community according to the procedures in paragraph 3-3c as soon as possible, but in no case later than 14 days after the violation, and will continue monitoring until remedial actions are completed and the average annual concentration no longer exceeds the respective MCL. Continued monitoring for gross alpha-related contamination will occur quarterly, while gross beta-related monitoring will be monthly. If any gross beta MCL is exceeded, the major radioactive components will be identified.
- (8) Surface water treatment requirements. All USFK water systems employing surface water sources or GWUDISW will meet the surface water treatment requirements delineated in table 3-1.
- (9) Turbidity requirements. USFK PWS filtered waters will be tested for turbidity at least once every four hours. If the turbidity exceeds the MCL as listed in table 3-1, or if the turbidity exceeds 5 NTU, the installation will complete the notification in paragraph 3-3c as soon as possible, but in no case later than 14 days after the violation and will undertake remedial action.
- (10) Secondary drinking water requirements. The secondary drinking water requirements cover contaminants that affect the taste, odor, or appearance of drinking water. The secondary MCLs are shown in table 3-12. Monitoring of the secondary contaminants is not required, but the results of routine testing can be useful to the plant operation.
- (11) Non-public water system requirements. USFK NPWSs will be monitored at a minimum for total coliforms and disinfectant residuals at least quarterly. The USFK, ACoS Engineer in coordination with the USFK Surgeon, will evaluate installation commander requests for waivers regarding the quarterly monitoring frequency at non-public systems.

- (12) Alternative water supplies. Alternative water sources include POE/POU treatment devices and bottled water supplies. An installation commander, in consultation with the installation medical authority, may approve the use of an alternative water source. The U.S. Comptroller General has stated that the use of appropriated funds to purchase bottled water is authorized only if it is a government necessity to maintain a supply of drinking water in the workplace or government-furnished living quarters, and no other potable water is reasonably available without charge at a lower cost.
- c. Notification requirements. When a USFK water system is out of compliance with the primary MCLs, the Installation Commander shall notify the appropriate DoD medical authority, USFK Engineer, and installation personnel (U.S. and ROK). The notice will provide a clear and readily understandable explanation of the violation, any potential adverse health effects, the population at risk, the steps that the system is taking to correct the violation, the necessity for seeking alternative water supply, if any, and any preventive measures the consumer should take until the violation is corrected. The USFK, ACofS Engineer will coordinate notification of host nation authorities in cases where off-installations populations are at risk.
 - d. Personnel qualification requirements. Personnel engaged or employed in operation and maintenance of water treatment facilities will be required to meet certification or training requirements as developed by the USFK ACofS, Engineer.
 - e. Waiver. Only the USFK, ACofS, Engineer, in coordination with the USFK Surgeon, may grant waivers regarding the requirements in this chapter.

Table 3-1
Surface Water Treatment Requirements

1. Unfiltered Systems

a. Systems that use unfiltered surface water or GWUDISW will analyze the raw water for total coliforms or fecal coliforms at least weekly and for turbidity at least daily for a minimum of one year. If the total coliforms and/or fecal coliforms exceed 100/100 ml and 20/100 ml, respectively, appropriate filtration must be applied. Appropriate filtration must also be applied if turbidity exceeds 1 NTU.

b. Disinfection must achieve at least 99.9 percent (3-log) inactivation of *Giardia lamblia* cysts and 99.99 percent inactivation of viruses by meeting applicable CT values, as shown in Tables 3-11-1.1 through 3-11.3.

c. Disinfection systems must have redundant components to ensure uninterrupted disinfection during operational periods.

d. Disinfectant residual monitoring at the entry point to the distribution system is required at least once every 4 hours that the system is in operation. Disinfectant residual measurements in the distribution system will be made weekly.

e. Disinfectant residual in water entering the distribution system must be maintained at a minimum of 0.2 mg/L.

f. If disinfectant residuals in the distribution system are undetected in more than 5 percent of monthly samples for two consecutive months, appropriate filtration must be implemented.

g. Water in a distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml measured as heterotrophic plate count is considered to have a detectable disinfectant residual for the purpose of determining compliance with the surface water treatment requirements.

2. Filtered Systems

a. Filtered water systems will provide a combination of disinfection and filtration that achieves a total of 99.9 percent (3-log) removal of *Giardia lamblia* cysts and 99.99 percent (4-log) removal of viruses.

b. The turbidity of filtered water will be monitored at least once every 4 hours that the system is in operation.

c. The turbidity of filtered water will not exceed 0.5 NTU in 95 percent of the analyses in a month, with a maximum of 5 NTU.

d. Disinfection must provide the remaining log-removal of *Giardia lamblia* cysts and viruses not obtained by the filtration technology applied.*

e. Disinfection residual maintenance and monitoring requirements are the same as those for unfiltered systems.

* Proper conventional treatment typically removes 2.5 log *Giardia* and 2.0 log viruses. Proper direct filtration typically removes 2.0 log *Giardia* and 2.0 log viruses. Less log removal may be assumed if treatment is not properly applied according to commonly accepted industry standards.

Table 3-2 Total Coliform Monitoring Frequency			
Population Served			Minimum Number of Routine Samples Per Month
25	to	1,000 ¹	1
1,001	to	2,500	2
2,501	to	3,300	3
3,301	to	4,100	4
4,101	to	4,900	5
4,901	to	5,800	6
5,801	to	6,700	7
6,701	to	7,600	8
7,601	to	8,500	9
8,501	to	12,900	10
12,901	to	17,200	15
17,201	to	21,500	20
21,501	to	25,000	25
25,001	to	33,000	30

NOTE:

1. A non-community water system using groundwater (except GWUDISW) and serving 1,000 or less people may monitor once in each calendar quarter during which the system provides water provided a sanitary survey conducted within the last five years shows the system is supplied solely by a protected groundwater source and free of sanitary defects.

Systems serving less than 4,900 people that use groundwater (except GWUDISW) and collect samples from different sites may collect all samples on a single day. All other systems must collect samples at regular intervals throughout the month.

Table 3-3 Inorganic Chemical MCLs	
Contaminant	MCL
Antimony ²	0.006 mg/L
Arsenic ¹	0.05 mg/L
Asbestos ²	7 million fibers/L (longer than 10 um)
Barium ²	2.0 mg/L
Beryllium ²	0.004 mg/L
Cadmium ²	0.005 mg/L
Chromium ²	0.1 mg/L
Cyanide (as free Cyanide) ²	0.2 mg/L
Fluoride ³	4.0 mg/L
Mercury ²	0.002 mg/L
Nickel ²	0.1 mg/L
Nitrate ⁴	10 mg/L (as N)
Nitrite ⁴	1 mg/L (as N)
Total Nitrite and Nitrate ⁴	10 mg/L (as N)
Selenium ²	0.05 mg/L
Sodium ⁵	
Thallium ²	0.002 mg/L

NOTES:

1. MCL applies only to CWS.
2. MCLs apply to CWS and NTNC water systems.
3. Fluoride also has a secondary MCL at 2.0 mg/L. The primary MCL applies only to CWS. See criteria 3-3b (3) for additional requirements.
4. MCLs apply to CWS, NTNC, and TNC systems.
5. No MCL established. Monitoring is required so concentration levels can be made available on request.

Table 3-4 Inorganics Monitoring Requirements				
Contaminant	Groundwater Baseline Requirement ¹	Surface Water Baseline Requirement	Trigger That Increases Monitoring ²	Waivers
Antimony	1 sample / 3 yr	Annual sample	>MCL	---
Arsenic	1 sample / 3 yr	Annual sample	>MCL	---
Asbestos	1 sample every 9 years	1 sample every 9 years	>MCL	Yes ³
Barium	1 sample / 3 yr	Annual sample	>MCL	---
Beryllium	1 sample / 3 yr	Annual sample	>MCL	---
Cadmium	1 sample / 3 yr	Annual sample	>MCL	---
Chromium	1 sample / 3 yr	Annual sample	>MCL	---
Corrosivity ⁴	Once	Once	---	---
Cyanide	1 sample / 3 yr	Annual sample	>MCL	---
Fluoride	1 sample / 3 yr	Annual sample	>MCL	---
Mercury	1 sample / 3 yr	Annual sample	>MCL	---
Nickel	1 sample / 3 yr	Annual Sample	>MCL	---
Total Nitrate/Nitrite	Annual sample	Quarterly	>50% Nitrite MCL	---
Nitrate	Annual sample	Quarterly	>50% MCL ⁵	Yes ⁶
Nitrite	Annual sample	Quarterly	>50% MCL ⁵	Yes ⁶
Selenium	1 sample / 3 yr	Annual sample	>MCL	---
Sodium	1 sample / 3 yr	Annual sample	---	---
Thallium	1 sample / 3 yr	Annual sample	>MCL	---

NOTES:

1. Samples shall be taken as follows: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment; surface water systems shall take at least one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after the treatment.
2. Increased monitoring requires a minimum of one sample per quarter. Increased quarterly monitoring requires a minimum of 2 samples per quarter for groundwater systems and at least 4 samples per quarter for surface water systems.
3. Necessity for analysis is predicated upon a vulnerability assessment conducted by the PWS.
4. PWSs shall be analyzed within one year of the effective date of country-specific Environmental governing standards to determine the corrosivity entering the distribution system. Two samples (one mid-winter and one mid-summer) will be collected at the entry point of the distribution system for systems using surface water or GWUDISW. One sample will be collected for systems using only ground water. Corrosivity characteristics of the water shall include measurements of pH, calcium, hardness, alkalinity, temperature, total dissolved solids, and calculation of the Langelier index. Positive index values are considered to be non-corrosive.
5. Increased quarterly monitoring shall be undertaken for nitrate and nitrite if a sample is >50% of the MCL.
6. The USFK ACofS, Engineer may approve reduced repeat sampling frequency based upon request and supporting data.

Table 3-5 Recommended Fluoride Concentrations at Different Temperatures			
Annual Average of Max. Daily Air Temperatures (°F)	Control Limits (mg/L)		
	Lower	Optimum	Upper
50.0 - 53.7	0.9	1.2	1.7
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

Table 3-6
Monitoring Requirements for Lead and Copper Water Quality Parameters

System size	Monitoring type	Initial monitoring ^{1,2}	Follow-up monitoring ^{1,2}	Reduced monitoring ³	Ultimate reduced monitoring
Population served		Two consecutive 6 month sampling periods	Two consecutive 6 month sampling periods	annually for 3 years	every 3 years
10,000 - 100,000	Cold Water Tap (1st Draw)	60	60	30	30
	POE ⁵	None	1	1	1
	WQPs ⁴	None	10	7	7
3,301- 10,000	Cold Water Tap (1st Draw)	40	40	20	20
	POE ⁵	None	1	1	1
	WQPs ⁴	None	3	3	3
501 - 3,300	Cold Water Tap (1st Draw)	20	20	10	10
	POE ⁵	None	1	1	1
	WQPs ⁴	None	2	2	2
101 - 500	Cold Water Tap (1st Draw)	10	10	5	5
	POE ⁵	None	1	1	1
	WQPs ⁴	None	1	1	1

Table 3-6 (Cont) Monitoring Requirements for Lead and Copper Water Quality Parameters					
System size	Monitoring type	Initial monitoring ^{1,2}	Follow-up monitoring ^{1,2,3}	Reduced monitoring ⁴	Ultimate reduced monitoring
Population served		Two consecutive 6 month sampling periods	Two consecutive 6 month sampling periods	annually for 3 years	every 3 years
<100	Cold Water Tap (1st Draw)	5	5	5	5
	POE	None	1	1	1
	WQPs ⁶	None	1	1	1

NOTES:

1. Two consecutive six-month monitoring periods.

2. Sampling sites shall be based on a hierarchical approach. For CWS, priority will be given to single family residences which contain copper pipe with lead solder installed after 1982, contain lead pipes, or are served by lead service lines; then, structures, including multifamily residences, with the foregoing characteristics; and finally, residences and structures with copper pipe with lead solder installed before 1983. For NTNC systems, sampling sites will consist of structures that contain copper pipe with lead solder installed after 1982, contain lead pipes, and/or are served by lead service lines. First draw samples will be collected from a cold water kitchen or bathroom tap; non-residential samples will be taken at an interior tap from which water is typically drawn for consumption.

3. Follow-up monitoring is performed if a system exceeds the lead or copper action level during any monitoring event.

4. Annually for lead and copper if action levels are met during each of two consecutive six month monitoring periods. Annual sampling will be conducted during the months of June, July, August, and September.

5. POE: Point of entry into the water distribution system.

6. Water Quality Parameter samples (WQPs) will be representative of water quality throughout the distribution system and include a sample from the entry to the distribution system. Samples will be taken in duplicate for pH, alkalinity, calcium, conductivity or total dissolved solids, and water temperatures to allow a corrosivity determination (via a Langelier saturation index or other appropriate saturation index); additional parameters are orthophosphate when a phosphate inhibitor is used and silica when a silicate inhibitor is used.

Table 3-7 Synthetic Organic Chemical MCLs		
Contaminant	MCL, mg/L	Detection limit, mg/L
Pesticides/PCBs		
Alachlor	0.002	0.0002
Aldicarb	0.003	0.0005
Aldicarb sulfone	0.003	0.0008
Aldicarb sulfoxide	0.004	0.0005
Atrazine	0.003	0.0001
Benzo [a] pyrene	0.0002	0.00002
Carbofuran	0.04	0.0009
Chlordane	0.002	0.0002
Dalapon	0.2	0.0002
2,4-D	0.07	0.0001
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	0.00002
Di(2-ethylhexyl) adipate	0.4	0.0006
Di(2-ethylhexyl) phthalate	0.006	0.0006
Dinoseb	0.007	0.0002
Diquat	0.02	0.0004
Endrin	0.002	0.00002
Endothall	0.1	0.009
Ethylene dibromide (EDB)	0.00005	0.00001
Glyphosate	0.7	0.006
Heptachlor	0.0004	0.00004
Heptachlorepoide	0.0002	0.00002
Hexachlorobenzene	0.001	0.0001
Hexachlorocyclopentadiene	0.05	0.0001
Lindane	0.0002	0.00002

Table 3-7 Synthetic Organic Chemical MCLs		
Contaminant	MCL, mg/L	Detection limit, mg/L
Pesticides/PCBs		
Methoxychlor	0.04	0.0001
Oxamyl (Vydate)	0.2	0.002
PCBs (as decachlorobiphenyls)	0.0005	0.0001
Pentachlorophenol	0.001	0.00004
Picloram	0.5	0.0001
Simazine	0.004	0.00007
2,3,7,8-TCDD (Dioxin)	3×10^{-8}	5×10^{-9}
Toxaphene	0.003	0.001
2,4,5-TP (Silvex)	0.05	0.0002
Volatile Organic Chemicals		
Benzene	0.005	0.0005
Carbon tetrachloride	0.005	0.0005
o-Dichlorobenzene	0.6	0.0005
cis-1,2-Dichloroethylene	0.07	0.0005
trans-1,2-Dichloroethylene	0.1	0.0005
1,1-Dichloroethylene	0.007	0.0005
1,1,1-Trichloroethane	0.20	0.0005

Table 3-7 Synthetic Organic Chemical MCLs		
Contaminant	MCL, mg/L	Detection limit, mg/L
Volatile Organic Chemicals		
1,2-Dichloroethane	0.005	0.0005
Dichloromethane	0.005	0.0005
1,1,2-Trichloroethane	0.005	0.0005
1,2,4-Trichlorobenzene	0.07	0.0005
1,2-Dichloropropane	0.005	0.0005
Ethylbenzene	0.7	0.0005
Monochlorobenzene	0.1	0.0005
para-Dichlorobenzene	0.075	0.0005
Styrene	0.1	0.0005
Tetrachloroethylene	0.005	0.0005
Trichloroethylene	0.005	0.0005
Toluene	1.0	0.0005
Vinyl chloride	0.002	0.0005
Xylene (total)	10	0.0005
Other Organic Chemicals		
Acrylamide	0.05% dosed at 1 ppm ¹	
Epihydrochlorin	Treatment technique 0.01% dosed at 20 ppm ¹	

Note:

- Use current USEPA test methods.

¹ Only applies when adding these polymer flocculants to the treatment process. No sampling is required, the system certifies that dosing is within specified limits.

Table 3-8 Synthetic Organic Chemical Monitoring Requirements				
Contaminant	Base Requirement ¹		Trigger for more monitoring ²	Waivers
	Groundwater	Surface water		
VOCs	Quarterly	Quarterly	>0.0005 mg/L	Yes ^{3,4}
Pesticides/ PCBs	4 quarterly samples/3 yrs during most likely period for their presence		>Detection limit ⁵	Yes ^{4,6}

NOTES:

1. Groundwater systems shall take a minimum of one sample at every entry point which is representative of each well after treatment; surface water systems will take a minimum of one sample at every entry point to the distribution system at a point which is representative of each source after treatment. For CWS, monitoring compliance is to be met within 1 year of the publishing of the EGS; for NTNC water systems, compliance is to be met within 2 years of the publishing of the EGS.

2. Increased monitoring will be conducted quarterly. For groundwater systems a minimum of 2 quarterly samples are required and for surface water systems a minimum of 4 quarterly samples are required before a system can reduce monitoring to annually.

3. Repeat sampling frequency may be reduced to annually after one year of no detection and every three years after three rounds of no detection.

4. Monitoring frequency may be reduced if warranted based on a vulnerability assessment by the PWS.

5. Detection limits noted in table 3-7, or as determined by the best available testing technology. Following SOC detection and increased monitoring, installation may request that the USFK ACoS, Engineer approve reduced monitoring if the water system is reliably and consistently below the MCL.

6. Repeat sampling frequency may be reduced to the following if after one round of no detection; systems > 3,300 reduce to 2 samples/year every 3 years, or systems < 3,300 reduce to 1 sample every 3 years.

NOTE: Compliance is based on an annual running average for each sample point for systems monitoring quarterly or more frequently; for systems monitoring annually or less frequently, compliance is based on a single sample, unless the USFK ACoS, Engineer requests a confirmation sample, in which case compliance is based upon the average of the original and confirmation sample. A system is out of compliance if any contaminant exceeds the MCL. If four consecutive quarters of sampling results are not available, and after receipt of written approval from the USFK ACoS, Engineer, an installation may substitute 6 quarters of sampling results collected during the past two years to determine compliance.

Table 3-9 Total Trihalomethane Monitoring Requirements			
Population Served by System	Number of Samples Per Distribution System	Frequency of Samples	Type of Sample
10,000 or more	4	Quarterly	Treated
Less than 10,000	1	Annually	Treated

NOTES:

1. One of the samples must be taken at a location in the distribution system reflecting the maximum residence time of water in the system. The remaining samples shall be taken at representative points in the distribution system. Systems using groundwater sources that add a disinfectant should have one sample analyzed for maximum total trihalomethane potential. Systems employing surface water sources, in whole or in part, that add a disinfectant should have one sample analyzed for total trihalomethanes.
2. Compliance is based upon a running yearly average of quarterly samples for systems serving more than 10,000 people. Noncompliance exists if the average exceeds the MCL. For systems serving less than 10,000 that have a maximum total trihalomethane potential sample exceeding the MCL, a sample for total trihalomethanes shall be analyzed. If the total trihalomethane sample exceeds the MCL, noncompliance results.
3. If four consecutive quarters of sampling results are not available, upon receipt of written approval from the USFK ACoS, Engineer, an installation may substitute 6 quarters of sampling results collected during the past two years to determine compliance.

Table 3-10 Radionuclide MCLs and Monitoring Requirements	
MCLs Contaminant	MCL, pCi/L
Gross Alpha ¹	15
Combined Radium-226 and 228	5
Gross Beta ²	50
Strontium-90	8
Tritium	20,000

MONITORING REQUIREMENTS:

A gross alpha particle activity measurement may be substituted for radium-226 and radium-228 provided that the measured gross alpha particle activity does not exceed 5 pCi/L.

Where radium-228 may be present in drinking water, radium-226 and/or -228 analyses should be performed when the gross alpha particle activity is > 2 pCi/L.

NOTES:

1. Gross alpha activity includes radium-226, but excludes radon and uranium.
2. Gross beta activity refers to the sum of beta particle and photon activity from manmade radionuclides. If gross beta activity exceeds the MCL, i.e., equivalence to a dose of 4 millirem/year, the concentrations of the individual components (Strontium-90 and Tritium) must be determined.

Table 3-11-1.1
CT values (CT_{99.9}) for 99.9 percent inactivation of *Giardia Lamblia* Cysts by free chlorine at 0.5°C or lower

Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≥ 9.0
≤ 0.4	137	163	195	237	277	329	390
0.6	141	168	200	239	286	342	407
0.8	145	172	205	246	295	354	422
1.0	148	178	210	253	304	365	437
1.2	152	180	215	259	313	376	451
1.4	155	184	221	266	321	387	464
1.6	157	189	228	273	329	397	477
1.8	162	193	231	279	338	407	489
2.0	165	197	236	286	346	417	500
2.2	169	201	242	297	353	426	511
2.4	172	205	247	298	361	435	522
2.6	175	209	252	304	368	444	533
2.8	178	213	257	310	375	452	543
3.0	181	217	286	316	382	460	552

* These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature and at the higher pH.

Table 3-11-1.2
CT values (CT_{99.9}) for 99.9 percent inactivation of Giardia Lamblia Cysts by free chlorine at 5.0°C*

Free Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≥ 9.0
≤ 0.4	97	117	139	166	198	236	279
0.6	100	120	143	171	204	244	291
0.8	103	122	146	175	210	252	301
1.0	105	125	149	179	216	260	312
1.2	107	127	152	183	221	267	320
1.4	109	130	155	187	227	274	329
1.6	111	132	158	192	232	281	337
1.8	114	135	162	196	238	287	345
2.0	116	138	165	200	243	294	353
2.2	118	140	169	204	248	300	361
2.4	120	143	172	209	253	306	368
2.6	122	146	175	213	258	312	375
2.8	124	148	178	217	263	318	382
3.0	126	151	182	221	268	324	389

* These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} values at the lower temperature, and at the higher pH.

Table 3-11-1.3
CT values (CT_{99.9}) for 99.9 percent inactivation of *Giardia Lamblia* Cysts by free chlorine at 10.0°C*

Free Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≥ 9.0
≤ 0.4	73	88	104	125	149	177	209
0.6	75	90	107	128	153	183	218
0.8	78	92	110	131	158	189	226
1.0	79	94	112	134	162	195	234
1.2	80	95	114	137	166	200	240
1.4	82	98	116	140	170	208	247
1.6	83	99	119	144	174	211	253
1.8	86	101	122	147	179	215	259
2.0	87	104	124	150	182	221	265
2.2	89	105	127	153	186	225	271
2.4	90	107	129	157	190	230	276
2.6	92	110	131	160	194	234	281
2.8	93	111	134	163	197	239	287
3.0	95	113	137	166	201	243	292

* These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

Table 3-11-1.4 CT values (CT_{99.9}) for 99.9 percent inactivation of <i>Giardia Lamblia</i> Cysts by free chlorine at 15.0°C*							
Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≥ 9.0
≤ 0.4	49	59	70	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	60	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

* These CT values achieve greater than 99.9 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

Table 3-11-1.5 CT values (CT_{99.9}) for 99.9 percent inactivation of <i>Giardia Lamblia</i> Cysts by free chlorine at 20°C*							
Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≥ 9.0
≤ 0.4	36	44	52	62	74	89	108
0.6	38	45	54	64	77	92	109
0.8	39	46	55	66	79	95	113
1.0	39	47	56	67	81	98	117
1.2	40	48	57	69	83	100	120
1.4	41	49	58	70	85	103	123
1.6	42	50	59	72	87	105	126
1.8	43	51	61	74	89	108	129
2.0	44	52	62	75	91	110	132
2.2	44	53	63	77	93	113	135
2.4	45	54	65	78	95	115	138
2.6	46	55	66	80	97	117	141
2.8	47	56	67	81	99	119	143
3.0	47	57	68	83	101	122	146

* These CT values achieve greater than 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99.9} value at the lower temperature, and at the higher pH.

Table 3-11-1.6 CT values (CT 99.9) for 99.9 percent inactivation of <i>Giardia Lamblia</i> Cysts by free Chlorine at 25°C and higher*							
Residual (mg/L)	pH						
	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≥ 9.0
≤ 0.4	24	29	35	42	50	59	70
0.6	25	30	36	43	51	61	73
0.8	26	31	37	44	53	63	75
1.0	26	31	37	45	54	65	78
1.2	27	32	38	46	55	67	80
1.4	27	33	39	47	57	69	82
1.6	28	33	40	48	58	70	84
1.8	29	34	41	49	60	72	86
2.0	29	35	41	50	61	74	88
2.2	30	35	42	51	62	75	90
2.4	30	36	43	52	63	77	92
2.6	31	37	44	53	65	78	94
2.8	31	37	45	54	66	80	96
3.0	32	38	46	55	67	81	97

* These CT values achieve greater than 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT 99.9 value at the lower temperature, and at the higher pH.

Table 3-11-2 CT values (CT 99.9) for 99.9 percent inactivation of <i>Giardia Lamblia</i> Cysts by Chlorine Dioxide and Ozone *						
Temperature (°C)						
	<1	5	10	15	20	≥ 25
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.9	1.9	1.4	0.95	0.72	0.48

* These CT values achieve greater than 99.9 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT 99.9 value at the lower temperature for determining CT 99.9 values between indicated temperatures.

Table 3-11-3 CT values (CT 99.9) for 99.9 percent inactivation of <i>Giardia Lamblia</i> Cysts by Chloramines*						
Temperature (°C)						
	<1	5	10	15	20	25
Chloramines	3,800	2,200	1,850	1,500	1,100	750

* These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system must demonstrate, based on on-site studies or other information that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT 99.9 value at the lower temperature for determining CT 99.9 values between indicated temperatures.

Table 3-12 Secondary MCLs	
Contaminant	SMCL
Aluminum	0.05 - 0.2 mg/L
Chloride	250 mg/L
Color	15 color units
Corrosivity	Noncorrosive
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
PH	6.5 to 8.5
Silver	0.1 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

Chapter 4 WASTEWATER

4-1. SCOPE.

This chapter contains criteria to control and regulate discharges of wastewaters into surface waters. This includes, but is not limited to, storm water runoff associated with industrial activities, domestic and industrial wastewater discharges, and pollutants from indirect dischargers.

4-2. DEFINITIONS.

- a. **7-day average.** The arithmetic mean of pollutant parameters values for samples collected in a period of seven consecutive days.
- b. **30-day average.** The arithmetic mean of pollutant parameters values for samples collected in a period of 30 consecutive days.
- c. **Average monthly discharge limitations.** The highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" (based upon 24-hour composite sample results), measured during a calendar month divided by the number of "daily discharges" measured during that month.
- d. **Average weekly discharge limitations.** The highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" (based upon 24-hour composite sample results), measured during a calendar week divided by the number of "daily discharges" measured during that week.
- e. **Best Management Practices (BMPs).** Practical practices and procedures that will minimize or eliminate the possibility of pollution being introduced into waters of the host nation.
- f. **BOD₅.** The five-day measure of the dissolved oxygen used by microorganisms in the biochemical oxidation of organic matter. The pollutant parameter is biochemical oxygen demand (i.e., biodegradable organics in terms of oxygen demand).
- g. **CBOD₅.** The five-day measure of the pollutant parameter, carbonaceous biochemical oxygen demand. This test can substitute for the BOD₅ testing which suppresses the nitrification reaction/component in the BOD₅ test.
- h. **COD.** A measure of the oxygen consuming capacity of organic matter, chemical oxygen demand.
- i. **Conventional pollutants.** Biochemical oxygen demand (BOD₅), total suspended solids (TSS), oil and grease, fecal coliforms, and pH.
- j. **Daily discharge.** The "discharge of a pollutant" measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement (e.g., concentration) "daily discharge" is calculated as the average measurement of the pollutant over the day.
- k. **Direct discharge.** Any "discharge of pollutants" other than an indirect discharge.
- l. **Discharge of a pollutant.** Any addition of any pollutant or combination of pollutants to waters of ROK from any "point source."
- m. **Domestic sewage.** Used water and solids from residences.
- n. **Domestic wastewater treatment system (DWTS).** Any USFK or ROK facility designed to treat wastewater before its discharge to waters of the ROK and in which the majority of such wastewater is made up of domestic sewage.

- o. **Effluent.** Wastewater or other liquid-raw, partially or completely treated-flowing from a facility, basin, treatment process, or treatment plant.
- p. **Effluent limitation.** Any restriction imposed by these EGS on quantities, discharge rates, and concentrations of pollutants that are ultimately discharged from point sources into waters of the ROK.
- q. **Existing source.** A source that discharges pollutants to waters of the ROK, that was in operation, or under construction, prior to 1 October 1997.
- r. **Grab sample.** A single sample taken from a specific point and time.
- s. **Indirect discharge.** An introduction of pollutants in process wastewater to a DWTP.
- t. **Industrial Activities Associated with Storm Water.** Activities that during wet weather events may contribute pollutants to storm water runoff or drainage. (See Table 4-6)
- u. **Industrial wastewater.** Wastewater discharged either directly or indirectly from factories, processing facilities or other facilities listed in Table 4-4.
- v. **Industrial Wastewater Treatment System (IWTS).** Any USFK facility designed to treat process wastewater before its discharge to waters of the ROK other than a DWTS.
- w. **Interference.** Any addition of any pollutant or combination of pollutant discharges that inhibits or disrupts the DWTS, its treatment processes or operations, or its sludge handling processes, use or disposal.
- x. **Maximum daily discharge limitation.** The highest allowable daily discharge based on volume as well as concentration.
- y. **New source.** A source built or significantly modified on or after 1 October 1997 that directly or indirectly discharges pollutants to the wastewater system.
- z. **pH.** An abbreviation of the French term “pouvoir hydrogene”, literally “hydrogen power.” It expresses the intensity of acid or alkaline conditions of water. Mathematically it is the negative log to the base ten of the hydrogen ion concentration. In water, the pH values range from 0 (very acidic) to 14 (very alkaline).
- aa. **Point source.** Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock; but not including vessels, aircraft or any conveyance that merely collects natural surface flows of precipitation.
- bb. **Pollutant.** Includes, but is not limited to, the following: dredged spoil; solid waste; incinerator residue; filter backwash; sewage; garbage; sewage sludge; munitions; chemical wastes; biological materials; radioactive materials; heat; wrecked or discarded equipment; rock; sand; cellar dirt; and industrial, municipal, and agricultural waste discharged into water.
- cc. **Process wastewater.** Any water which during manufacturing or processing, comes into direct contact with, or results from the production or use of, any raw material, intermediate product, finished product, by-product, or waste product.
- dd. **Regulated facilities.** Those facilities for which criteria are established under this chapter, such as DWTs, IWTs, or industrial discharges.
- ee. **Sewer user fee areas.** Sewer user fee areas include Seoul, Pusan, Taegu, Chunchon, Sunghnam, and Uijongbu cities. In these areas, USFK pays sewer fee to Korean municipalities for the wastewater discharged to Korean sewer systems and its installations are allowed to discharge raw or primarily treated wastewater to Korean sewers without secondary treatment. Primary treatment will be provided when receiving sewer systems cannot provide adequate scouring velocities to convey settleable material in raw sewage. However, raw wastewater will be discharged to Korean sewers when the sewer systems are designed to handle raw wastewater.

- ff. **Storm Water.** Run-off and drainage from wet weather events such as rain, snow, ice, sleet or hail.
- gg. **Substantial modification.** Any modification to a facility of which the cost exceeds \$1,000,000 regardless of funding source.
- hh. **Surface Water.** All water which is open to the atmosphere and which is subject to direct surface run-off.
- ii. **Total suspended solids (TSS).** The pollutant parameter total filterable suspended solids.
- jj. **Waters of the ROK.** Surface waters including the territorial seas recognized under customary international law, including--
 - (1) All surface waters that are currently used, were used in the past, or may be susceptible to use in commerce.
 - (2) Surface waters that are or could be used for recreation or other purposes.
 - (3) Surface waters from which fish or shellfish are or could be taken and sold.
 - (4) Surface waters that are used or could be used for industrial purposes by industries.
 - (5) Surface waters including lakes, rivers, streams (including intermittent streams), sloughs, prairie potholes, or natural ponds.
 - (6) Tributaries of waters identified in subparagraphs 4-2ab(1) through (5) of this definition.

NOTE: Wastewater treatment systems, including treatment ponds or lagoons designed to meet the requirements of this chapter, are not waters of the ROK. This exclusion only applies to manmade bodies of water that neither were originally waters of the ROK nor resulted from impoundment of waters of the ROK.

4-3. CRITERIA.

- a. Effluent limitations for direct dischargers of conventional pollutants
 - (1) By 30 Sep 2003, all discharges of wastewater from existing US sources (one that was in operation, or under construction, prior to 1 October 1997 and not substantially modified) were to have met the standards for existing sources shown in Table 4-1.
 - (2) Sources that were considered new (built or significantly modified on or after 1 October 1997) must meet or exceed the standards for new sources shown in Table 4-1.
 - (3) After 30 Nov 2003, all new or significantly increased (more than 10%) discharges of pollutants directly discharged to waters of the ROK will comply with the following domestic wastewater effluent limitations. Sources of pollutant discharges that existed prior to 30 Nov 2003 must be upgraded to meet the following standards by 30 Sep 2011. (Below limitations are based on grab sampling).
 - (a) For locations other than golf courses:
 - 1. BOD₅ and total suspended solids: 20 mg/l.
 - 2. pH 6.0 – 9.0
 - (b) For golf courses:
 - 1. BOD₅ and total suspended solids: 10 mg/l.
 - 2. pH 6.0 – 9.0
 - (4) Where ever possible, Commanders shall coordinate with local municipal officials and concurrently request, through the USFK ACofS, Engineer (FKEN-TMP), access to municipal sewer services IAW the provisions of Article VI of the US-ROK SOFA.
 - (5) Monitoring. Monitoring requirements apply to all regulated facilities. The monitoring frequency (including both sampling and analysis) given in Table 4-3

includes all three parameters that are regulated (BOD₅, TSS and pH). Samples should be collected at the point of discharge prior to any mixing with the receiving water.

- (6) Recordkeeping Requirements. The following monitoring and recordkeeping requirements are BMPs and apply to all facilities. Retain records for three years.
 - (a) The effluent, concentration, or other measurement specified for each regulated parameter.
 - (b) The daily volume of effluent discharge from each point source.
 - (c) Test procedures for the analysis of pollutants.
 - (d) The date, exact place and time of sampling and/or measurements.
 - (e) The person who performed the sampling and/or measurements.
 - (f) The date of analysis.
- b. Effluent limitations for non-categorical industrial indirect dischargers. The following effluent limits will apply to all discharges of pollutants to DWTs and associated collection systems from process wastewater for which categorical standards have not been established (see following section for a list of categorical standards).
 - (1) Solid or viscous pollutants. The discharge of solid or viscous pollutants that would result in an obstruction to the domestic wastewater treatment plant flow is prohibited.
 - (2) Ignitability and explosivity.
 - (a) The discharge of wastewater with a closed cup flashpoint of less than 60°C (140°F) is prohibited.
 - (b) The discharge of wastes with any of the following characteristics is prohibited:
 1. A liquid solution that contains more than 24% alcohol by volume and has a flash point less than 60°C (140°F).
 2. A non-liquid that under standard temperature and pressure can cause a fire through friction.
 3. An ignitable compressed gas.
 4. An oxidizer, such as peroxide.
 - (3) Reactivity and fume toxicity. The discharge of any of the following wastes is prohibited:
 - (a) Wastes that are normally unstable and readily undergo violent changes without detonating.
 - (b) Wastes that react violently with water.
 - (c) Wastes that form explosive mixtures with water or form toxic gases or fumes when mixed with water.
 - (d) Cyanide or sulfide waste that can generate potentially harmful toxic fumes, gases, or vapors.
 - (e) Waste capable of detonation or explosive decomposition or reaction at standard temperature and pressure.
 - (f) Wastes that contain explosives regulated by [chapter 5](#).
 - (g) Wastes which produce any toxic fumes, vapors, or gases with the potential to cause safety problems or harm to workers.
 - (4) Corrosivity. It is prohibited to discharge pollutants that have the potential to be structurally corrosive to the DWTs. Specifically, no discharge of wastewater below a pH of 5.0 or above pH of 9.0 is allowed, unless the DWTs is specifically designed to handle this type of wastewater.
 - (5) Oil and grease. The discharge of the following oils, which can pass through or cause interference to the DWTs, is prohibited: petroleum oil, non-biodegradable cutting oil, and products of mineral oil origin.

- (6) Spills and batch discharges (slugs). Activities or installations that have a significant potential for spills or batch discharges will develop a slug prevention plan. Each plan must contain the following minimum requirements:
 - (a) Description of discharge practices, including non-routine batch discharges;
 - (b) Description of stored chemicals;
 - (c) Plan for immediately notifying the DWTS of slug discharges and discharges that would violate prohibitions under this section, including procedures for subsequent written notification within five days;
 - (d) Necessary practices to prevent accidental spills. This would include proper inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, and worker training;
 - (e) Proper procedures for building containment structures or equipment;
 - (f) Necessary measures to control toxic organic pollutants and solvents; and
 - (g) Proper procedures and equipment for emergency response, and any subsequent plans necessary to limit damage suffered by the treatment plant or the environment.
- (7) Trucked and hauled waste. The discharge of trucked and hauled waste into the DWTS, except at locations specified by the DWWTP, is prohibited.
- (8) Heat in amounts that inhibit biological activity in the DWTS resulting in interference, but in no case in such quantities that the temperature of the process water at the DWTS exceeds 40°C (104°F).
- c. Effluent limitations for categorical industrial dischargers (direct or indirect).
 - (1) There are no categorical industrial dischargers (electroplating, anodizing, metal coatings, chemical etching and milling, electroplating, printed circuit board manufacturing) and no TTO testing or management plan are required for USFK installations.
 - (2) A vehicle wash facility is classified as a point source for industrial wastewater as shown in Table 4-4 and is required to meet the effluent industrial limitations in Table 4-5.
- d. Storm Water Management
 - (1) Develop and implement storm water pollution prevention (P2) plans for activities listed in Table 4-6.
 - (2) Employee Training. Personnel who handle hazardous substances or perform activities that could contribute pollution to wet weather events should be trained in appropriate Best Management Practices. Such training should stress P2 principles and awareness of possible pollution sources including non-traditional sources such as sediment, nitrates, pesticides and fertilizers.
- e. Septic System. Discharge to a septic system of wastewater containing industrial pollutants in levels that will inhibit biological activity is prohibited. Known discharges of industrial pollutants to existing septic systems shall be eliminated and appropriate actions should be taken to eliminate contamination.
- f. Sludge Disposal. All sludges produced during the treatment of wastewater will be disposed of under Chapter 6, Hazardous Waste; or Chapter 7, Solid Waste; as appropriate.
- g. Complaint system. Each installation shall implement a system for investigating water pollution complaints from individuals or ROK water pollution control authorities. Chapter 1, paragraph 1-13 of these EGS describes USFK procedures for responding to ROK inquiries and complaints.

- h.* Personnel qualification requirements. Personnel engaged or employed in operation and maintenance of wastewater treatment facilities will be required to meet certification or training requirements as developed by the USFK ACoS, Engineer.
- i.* Laboratory analysis. A review of analytical procedures indicates that the Korean Standard Methods of Analysis are comparable to the U.S. EPA methods for analysis of wastewater. It is therefore acceptable for installations to perform analysis by either the Korean standard methods or U.S. EPA methods to assess compliance with the wastewater effluent limitations in this chapter.
- j.* A domestic garbage disposal unit (grinder) should not be installed and used on USFK installations or leased facilities. Facilities affected by this restriction include, but area not limited to residential housing, dining facilities, and restaurants. Units installed prior to publication of this pamphlet may continue to be used, but will not be replaced.

TABLE 4-1 DOMESTIC WASTEWATER EFFLUENT LIMITATIONS					
	TIME PERIOD	ROK receiving water	BOD ₅ (mg/L) ¹	TSS (mg/L) ¹	pH
EXISTING SOURCES	Average weekly limits	Class I & II	30	30	6.0 – 9.0
		Class III-V	60	60	
	Average monthly limits	Class I & II	30	30	6.0 - 9.0
		Class III-V	60	60	
NEW SOURCES	Average weekly limits	Class I & II	30	30	6.0 - 9.0
		Class III-V	45	45	
	Average monthly limits	All	30	30	6.0 - 9.0

NOTES:

1. All standards are based upon the use of 24-hour composite sample results.
2. The classifications of ROK receiving waters are based on the receiving water quality, and each region is notified by ROK Minister of Environment. For information on the classifications of ROK receiving waters, see Table 4-2.
3. Minimum monitoring frequency requirements are contained in Table 4-3.

Table 4-2 Existing sources - Classification of ROK receiving waters relevant to USFK installations?		
USFK INSTALLATION **	STREAM/RIVER (Discharge to)	CLASS ***
Camp Casey	Shinchon	IV
Camp Hovey	Shinchon	IV
Camp Nimble	Shinchon	IV
Camp Castle	Shinchon	IV
H-220 Heliport	Shinchon	IV
Camp Howze	Kokrung Chon	II
Camp Edwards	Kokrung Chon	II
Camp Stanton	Munsan Chon	V
Camp Garry Owen North	Munsan Chon	V
Camp Giant	Munsan Chon	V
Camp Greaves	Imjin River (downstream)	II
Camp Bonifas	Imjin River (downstream)	II
Camp Liberty Bell	Imjin River (downstream)	II
Warrior Base	Imjin River (downstream)	II
Swiss-Swede	Imjin River (downstream)	II
Camp Red Cloud	Uijongbu City Sewer*	NC
Camp Essayons	Uijongbu City Sewer*	NC
Camp Falling Water	Uijongbu City Sewer*	NC
Camp Kyle	Uijongbu City Sewer*	NC
Camp Sears	Uijongbu City Sewer*	NC
Camp Jackson	Uijongbu City Sewer*	NC
Camp La Guardia	Uijongbu City Sewer*	NC
Camp Stanley	Chungryangchon (upstream)	II
Camp Page	Chunchon City Sewer*	NC
Camp Colbern	Han River (Paldang-Tanchon)	I
Camp Market	Kulpochon	V
K-16	Songnam City Sewer*	NC
Yongsan Garrison	Seoul City Sewer*	NC

* Sewer User Fee Areas: No class (NC)

** Remote sites and training areas are not included.

Table 4-2 (continued) Existing sources - Classification of ROK receiving waters relevant to USFK installations		
USFK INSTALLATION **	STREAM/RIVER (Discharge to)	CLASS ***
Niblo Barracks	Seoul City Sewer*	NC
FEDE Compound	Seoul City Sewer*	NC
Camp Gray	Seoul City Sewer*	NC
CP Tango	Sangjuk Chon	I
Sungnam Golf Course	Han River (Paldang-Tan Chon)	I
Camp Humphreys	Anseong Chon	II
Camp Long	Wonju Chon	IV
Camp Eagle	Seom River (upstream)	I
Camp Carroll	Nakdong River (Kamchon Kumho River)	I
Camp Henry	Taegu City Sewer*	NC
Camp Walker	Taegu City Sewer*	NC
Camp George	Taegu City Sewer*	NC
Camp Hialeah	Pusan City Sewer*	NC
Pusan Storage Area	Pusan City Sewer*	NC
Pier #8	Pusan City Sewer*	NC
Osan Air Base	Chinwichon (downstream)	III
Kunsan Air Base	Kum River (downstream)	III
Taegu Air Base	Kumho River	III
Kwangju Air Base	Hwangryong River	II
Kimhae Air Base	Nakdong River (downstream)	III
Suwon Air Base	Suwon City Sewer*	NC
Chinhae Navy Base	Chinhae City Combined Sewer/Chinhae Bay*	NC

* Sewer User Fee Areas: No class (NC)

** Remote sites and training areas are not included.

Table 4-3 Monitoring requirements

Plant Capacity (MGD)	Monitoring Frequency
0.1 - 0.99	Monthly
1.0 – 4.99	Weekly
> 5.0	Daily

Table 4-4 Point sources of Industrial Wastewater effluent ?

- * Transportation/Vehicle Management Facility.
- i. Washing facility with area of 20 m² or larger or water usage of 2 m³/day or more.
 - ii. Repair facility with area of 230 m² or larger.
 - iii. Oil water separator facility.

Table 4-5 Industrial wastewater effluent (maximum daily discharge) limitations

Pollutant Category	ROK receiving water	
	Class I	Class II – V
ph	5.8 - 8.6	5.8 - 8.6
Normal hexane extracts:		
Mineral oil (mg/L)	1 or less	5 or less
Animal/vegetable oil (mg/L)	5 or less	30 or less
Phenol (mg/L)	1 or less	3 or less
Cyanide (mg/L)	0.2 or less	1 or less
Chromium (mg/L)	0.5 or less	2 or less
Soluble iron (mg/L)	2 or less	10 or less
Zinc (mg/L)	1 or less	5 or less
Copper (mg/L)	0.5 or less	3 or less
Cadmium (mg/L)	0.02 or less	0.1 or less
Mercury (mg/L)	0.001 or less (<i>undetectable</i>)	0.005 or less
Organic phosphorous (mg/L)	0.2 or less	1 or less
Arsenic (mg/L)	0.1 or less	0.5 or less
Lead (mg/L)	0.2 or less	1 or less
Hexavalent chromium (mg/L)	0.1 or less	0.5 or less
Soluble manganese (mg/L)	2 or less	10 or less
Fluorine (mg/L)	3 or less	15 or less
PCB (mg/L)	0.001 or less (<i>undetectable</i>)	0.003 or less
Coliform bacteria (numbers/mL)	100 or less	3,000 or less
Total suspended solids (mg/l)	60-80	80-120
Temperature (°C)	40 or less	40 or less
Total nitrogen (mg/L)	30 or less	60 or less
Total phosphorous (mg/L)	4 or less	8 or less
Trichlorethylene (mg/L)	0.06 or less	0.3 or less
Tetrachloroethylene (mg/L)	0.02 or less	0.1 or less
Alkyl benzene sulfonate (ABS) (mg/L)	3 or less	5 or less

NOTES:

1. The receiving water classifications are identified in Table 4-2.
2. Total suspended solids:
 - 60 mg/l for Class I with 2,000 m³/day or more flow rate,
 - 80 mg/l for Class I with less than 2,000 m³/day flow rate,
 - 80 mg/l for Class II -V with 2,000 m³/day or more flow rate,
 - 120 mg/l for Class II –V with less than 2,000m³/day flow rate.

Table 4-6 Best Management Practices	
Activity	Best Management Practice
Aircraft Ground Support Equipment Maintenance	Perform maintenance/repair activities inside Use drip pans to capture drained fluids Cap hoses to prevent drips and spills
Aircraft/runway deicing	Perform anti-icing before the storm Put critical aircraft in hangars/shelters
Aircraft/vehicle fueling operations	Protect fueling areas from the rain Provide spill response equipment at fueling station
Aircraft/vehicle maintenance & repair	Perform maintenance/repair activities inside Use drip pans to capture drained fluids
Aircraft/vehicle washing	Capture wash water and send to wastewater treatment plant Treat wash water with oil water separator before discharge
Bulk fuel storage areas	Use dry camlock connectors to reduce fuel loss Capture spills with drip pans when breaking connections Curb fuel transfer areas, treat with oil water separator
Construction activities	Construct sediment dams/silt fences around construction sites
Corrosion control activities	Capture solvent/soaps used to prepare aircraft for painting Perform corrosion control activities inside
Hazardous material storage	Store hazardous materials inside or under cover Reduce use of hazardous materials
Outdoor material storage areas	Cover and curb salt, coal, urea piles Store product drums inside or under cover Reduce quantity of material stored outside
Outdoor painting/depainting operations	Capture sandblasting media for proper disposal Capture paint clean up materials (thinners, rinsates)
Pesticide operations	Capture rinse water when mixing chemicals Store spray equipment inside
Power production	Capture leaks and spills from power production equipment using drip pans, etc.
Vehicle storage yards	Check vehicles in storage for leaks and spills
Dewatering operation at construction sites	Separate solids and treat with oil water separator

Chapter 5 HAZARDOUS MATERIAL

5-1. SCOPE.

This chapter contains criteria for the storage, handling, transportation, and disposition of hazardous materials used by USFK and its contractors. It does not cover solid or hazardous waste, underground storage tanks, petroleum storage, and related spill contingency and emergency response requirements. These matters are covered under other chapters. This document does not cover munitions.

5-2. DEFINITIONS.

- a. **Gaseous Toxic Chemical.** Toxic chemicals that are hazardous to human health or environment and that are gaseous at normal pressure and room temperature. See Table 5-8.
- b. **Hazardous Chemical Warning Label.** A label, tag, or marking on a container which provides the following information:
 - (1) Identification/name of hazardous chemicals,
 - (2) Appropriate hazard warnings, and
 - (3) The name and address of the manufacturer, importer or other responsible party; and which is prepared in accordance with DoD 6050.5-H.DoD Hazardous Chemical Warning Labeling System.
- c. **Hazardous Material.** Any material that is capable of posing an unreasonable risk to health, safety, or environment if improperly handled, stored, issued, transported, labeled, or disposed because it displays a characteristics listed in Table 5-1, or the material is listed in Appendix B, Table B.3. Munitions are excluded.
- d. **Hazardous Materials Information Resource System (HMIRS)** [formerly Hazardous Material Information System (HMIS)]. The Hazardous Materials Information Resource System (HMIRS) is a Department of Defense (DoD) automated system developed and maintained by the Defense Logistics Agency. HMIRS is the central repository for Material Safety Data Sheets (MSDS) for the United States Government military services and civil agencies. The HMIRS has been assigned Report Control Symbol DD-A&T(AR)1486 in accordance with DoD 8910-M. The web address for HMIRS is <http://www.dlis.dla.mil/hmirs/>.
- e. **Hazardous Material Shipment.** Any movement of hazardous material in a USFK land vehicle or a vehicle used under USFK contract either from an installation to a final destination off the same installation, or from a point of origin off the installation to a final destination on the installation, in excess of any of the following quantities:
 - (1) For hazardous material identified as a result of inclusion in Table B.3, any quantity in excess of the reportable quantity listed in Table B.3;
 - (2) For other liquid or semi-liquid hazardous material, in excess of 410 liters (110 gallons);
 - (3) For other solid hazardous material, in excess of 225 Kg (500 pounds); or
 - (4) For combinations of liquid, semi-liquid and solid hazardous materials, in excess of 340 Kg (750 pounds).
- f. **Material Safety Data Sheet (MSDS).** A form used by manufacturers of chemical products to communicate to users the chemical, physical, and hazardous properties of their product.
- g. **Monitored Chemicals.** Any chemical that is capable of posing a risk to health and environment, of which criteria are listed in Table 5-4.

- h.* **Management Regulated Toxic Chemicals.** Chemicals that are extremely hazardous to human health or to the environment. As a result of these hazards, the manufacture, import, and use of these chemicals are either prohibited or regulated by the MOE. See Table 5-5 and 5-6.
- i.* **Toxic Chemicals.** Chemicals that are hazardous to human health or to the environment. See Table 5-3.

5-3. CRITERIA.

- a.* Storage and handling of hazardous materials will adhere to DoD Component policies, including Joint Service Publication on Storage and Handling of Hazardous Materials. DLAI 4145.11, TM 38-410, NAVSUP PUB 573, AFJMAN 23-209, and MCO 4450.12A provide additional guidance on the storage and handling of hazardous materials. The International Maritime Dangerous Goods (IMDG) Code and appropriate DoD and component instructions provide requirements for international maritime transport of hazardous materials originating from DoD installations. International air shipments of hazardous materials originating from DoD installations are subject to International Civil Air Organization Rules or DoD Component guidance including AFJM 24-204, TM 38-250, NAVSUP 505, MCO P4030.19E, and DLAM 4145.3.
- b.* Hazardous material dispensing areas will be properly maintained. Drums/containers must not be leaking. Drip pans/absorbent materials will be placed under containers as necessary to collect drips or spills. Container contents will be clearly marked. Placards and labels available through supply channels are identified in Table 5-3. Dispensing areas will be located a sufficient distance away from catch basins and storm drains.
- c.* Installations will ensure that for each hazardous material shipment.
 - (1) The shipment is accompanied throughout by shipping papers that clearly describe the quantity and identity of the material and which include an MSDS;
 - (2) All drivers are briefed on the hazardous material included in the shipment, including health risks of exposure and the physical hazards of the material including potential for fire, explosion and reactivity;
 - (3) Drivers will be trained on spill control and emergency notification procedures. For any hazardous material categorized on the basis of Appendix B, Section B-1, the shipping papers and briefing for the driver include identification of the material as "Ignitable," "Corrosive," "Reactive," or "Toxic";
 - (4) The vehicles are subjected to a walk-around inspection by supervisory personnel before and after the material is loaded;
 - (5) Vehicles that transport hazardous materials must be equipped with the following:
 - (a) two or more pairs of protective gloves and boots,
 - (b) two or more protective coats, and
 - (c) two or more shovels; and
 - (6) Labels that meet the requirements of Table 5-2c must be affixed to every container of package of the toxic chemicals that are listed in Tables 5-3. All labels must appear in both English and Korean.
- d.* Each installation will maintain a master listing of all storage locations for hazardous materials and an inventory of all hazardous materials contained therein (see criteria b, chapter 18).
- e.* Material Safety Data Sheets. Each material safety data sheet shall be in English or in Korean and shall contain at least the following information:
 - (1) The identity used on the label;
 - (2) If the hazardous chemical is a single substance, its chemical and common name and its Chemical Abstract Service (CAS) Number.

- (3) If the hazardous chemical is a mixture which has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients which contribute to these known hazards, and the common name(s) of the mixture itself; or,
 - (4) If the hazardous chemical is a mixture which has not been tested as a whole:
 - (a) The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise 1% or greater of the composition, except that chemicals identified as carcinogens shall be listed if the concentrations are 0.1% or greater;
 - (b) The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise less than 1% (0.1% for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations which would exceed an established OSHA permissible exposure limit, or could present a health hazard to employees; and
 - (c) The chemical and common name(s) of all ingredients which have been determined to present a physical hazard when present in the mixture.
 - (5) Physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point);
 - (6) The physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity;
 - (7) The health hazards of the hazardous chemical, including signs and symptoms of exposure, and any medical conditions which are generally recognized as being aggravated by exposure to the chemical;
 - (8) The primary route(s) of entry (inhalation, skin absorption, ingestion, etc.);
 - (9) The appropriate occupational exposure limit recommended by the chemical manufacturer, importer, or employer preparing the material safety data sheet, where available;
 - (10) Whether the hazardous chemical has been found to be a potential carcinogen;
 - (11) Any generally applicable precautions for safe handling and use which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks;
 - (12) Any generally applicable control measures which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, such as appropriate engineering controls, work practices, or personal protective equipment (PPE);
 - (13) Emergency and first aid procedures;
 - (14) The date of preparation of the material safety data sheet or the last change to it; and,
 - (15) The name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the Material Safety Data Sheets, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.
- f. Each work center will maintain a file of MSDS for each hazardous material procured, stored or used at the work center. MSDSs that are not contained in HMIRS and those MSDS prepared for locally purchased items should be incorporated into HMIRS. A file of MSDS information not contained in HMIRS should be maintained on site.
 - g. All hazardous materials on USFK installations will have a Hazardous Chemical Warning Label IAW DOD 6050.5-H and have MSDS information either available or in

HMIRS IAW DOD 6050.1 and other component instructions. These requirements apply throughout the life cycle of these materials. DOD 6050.5-H exempts small “consumer” quantities of hazardous materials from some of the labeling requirements. Consult your unit safety manager or installation safety office for specific guidance on small and consumer quantity exemptions.

- h.* USFK installations will reduce the use of hazardous materials where practical through resource recovery, recycling, source reduction, acquisition, or other minimization strategies in accordance with Service guidance on improved hazardous material management processes and techniques.
- i.* All excess hazardous material will be processed through the Defense Reutilization and Marketing Service (DRMS) in accordance with the procedures in DoD 4160.21-M. The DRMS will only donate, transfer, or sell hazardous material to environmentally responsible parties. This paragraph is not intended to prohibit the transfer of usable HM between USFK activities participating in a regional or local pharmacy or exchange program.
- j.* All personnel who use, handle or store hazardous materials will be trained in accordance with DoDI 6050.1 and other component instructions.
- k.* The installation must prevent the unauthorized entry of persons or livestock into hazardous materials storage areas.

Table 5-1 Typical Hazardous Materials Characteristics

- | |
|--|
| 1. The item is a health or physical hazard. Health hazards include carcinogens, corrosive materials, irritants, sensitizers, toxic materials, and materials which damage the skin, eyes, or internal organs. Physical hazards include combustible liquids, compressed gasses, explosives, flammable materials, organic peroxides, oxidizers, pyrophoric materials, unstable (reactive) materials and water-reactive materials. |
| 2. The item and/or its disposal is regulated by the host nation because of its hazardous nature. |
| 3. The item contains asbestos, mercury, or polychlorinated biphenyls. |
| 4. The item has a flashpoint below 93° C (200° F) closed cup, or is subject to spontaneous heating or is subject to polymerization with release of large amounts of energy when handled, stored, and shipped without adequate control. |
| 5. The item is a flammable solid or is an oxidizer or is a strong oxidizing or reducing agent with a standard reduction potential of greater than 1.0 volt or less than -1.0 volt. |
| 6. In the course of normal operations, accidents, leaks, or spills, the item may produce dusts, gases, fumes, vapors, mists, or smokes with one or more of the above characteristics. |
| 7. The item has special characteristics that in the opinion of the manufacturer or the DoD Components could cause harm to personnel if used or stored improperly. |

Table 5.2 Label and color of toxic chemicals sign ?

A. For storage facilities

(1) Label:

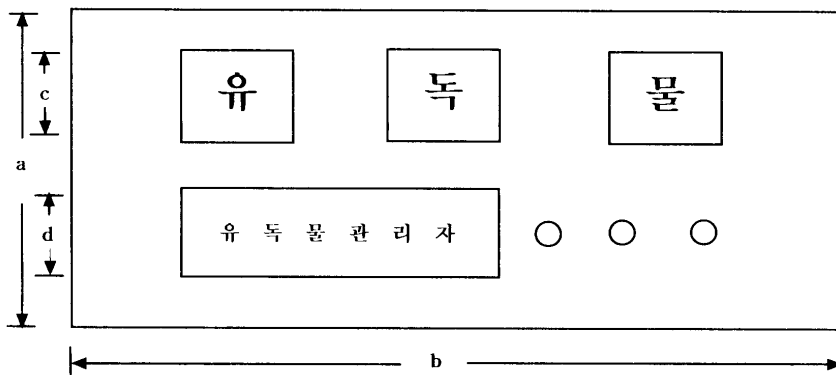


Figure 5.1.1 Label for toxic chemicals storage facilities (in Korean)

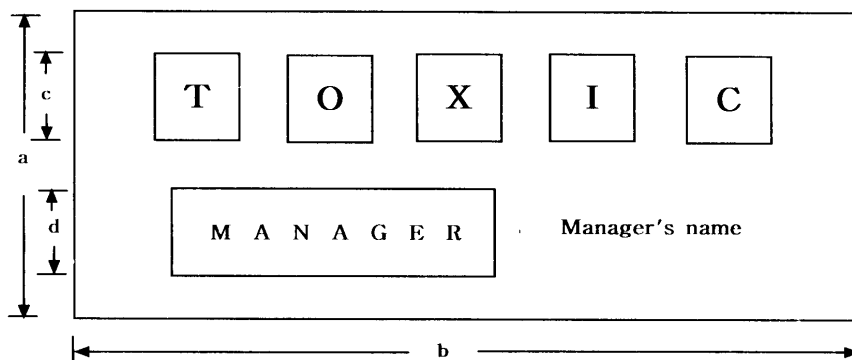


Figure 5.1.2 Label for toxic chemicals storage facilities (in English)

(2) Size:

- a = 50 cm or more
- b = 3/2a
- c = 1/4a and d=1/4a

(3) Color:

- a. Background: white
- b. Frame: black
- c. Letters of "toxic chemicals": red
- d. Name of toxic chemical manager: black

Table 5-2 (continue)
Label and color of toxic chemicals sign

B. For transportation vehicles

(1) Label:

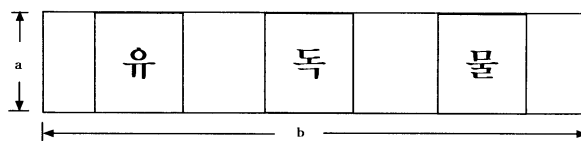


Figure 5.2.1 Label for toxic chemicals transportation vehicles (in Korean)

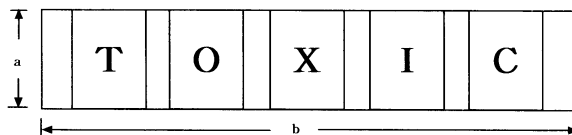


Figure 5.2.2 Label for toxic chemicals transportation vehicles (in English)

(2) Size:

a = 20 ~ 30 cm

b = 80 ~ 100 cm

(3) Color:

- a. Background: white
- b. Frame: black
- c. Letters of "toxic chemicals": red

Table 5-2 (Continue)
Label and color of toxic chemicals sign

C. For toxic chemicals containers or packages

(1) Label:

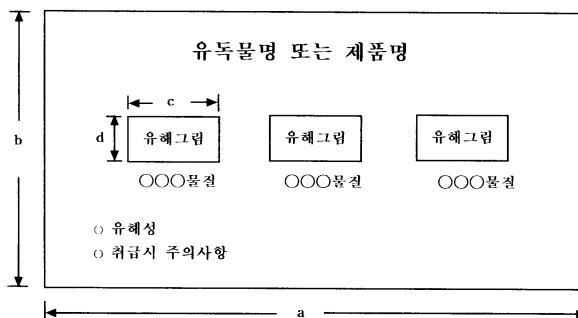


Figure 5.3.1 Label for toxic chemicals containers or packages (in Korean)

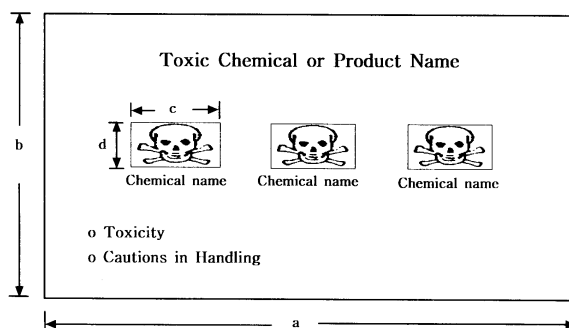


Figure 5.3.2 Label for toxic chemicals containers or packages (in English)

* Notes: If the mass (or volume) of toxic chemicals is less than 100g (or less than 100ml), only the toxic chemicals name and toxic chemical sign need to be provided.

(2) Size: depending on container volume (V)

- a. $V \geq 500L$: $(a \times b) \geq 450cm^2$, $0.25b \leq a \leq 4b$, $0.1(a \times b) \leq c \times d$
- b. $500L > V \geq 200L$: $(a \times b) \geq 300cm^2$, $0.25b \leq a \leq 4b$, $0.1(a \times b) \leq c \times d$
- c. $200L > V \geq 50L$: $(a \times b) \geq 180cm^2$, $0.25b \leq a \leq 4b$, $0.1(a \times b) \leq c \times d$
- d. $50L > V \geq 5L$: $(a \times b) \geq 90cm^2$, $0.25b \leq a \leq 4b$, $0.1(a \times b) \leq c \times d$
- e. $5L > V$: More than 5% of total surface area excluding the top and bottom area of container, $0.25b \leq a \leq 4b$, $0.1(a \times b) \leq c \times d$

(3) Color:

- a. Background: white or the same color as surface color of container of cover.
- b. Frame and letters: black (if the container is close to black, its frame and letters may be in contrast to background colors)
- c. Background color of hazardous sign: yellow or orange
- d. Sign and its frame: black

Table 5-3 List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-1	Sodium peroxide; 1313-60-6	(1),(4)	5
97-1-2	Hydrogen peroxide; 7722-84-1	(1),(4)	6
97-1-3	Urea peroxide; 124-43-6	(3),(4)	17
97-1-4	Guazatine; 13516-27-3	(2),(5)	3.5
97-1-5	Glutaraldehyde; 111-30-8	(2),(5)	
97-1-6	Glycidyl acrylate; 106-90-1	(3)	
97-1-7	Sodium; 7440-23-5	(1),(6)	
97-1-8	Naled; 300-76-5	(2),(5)±	1
97-1-9	Lead compounds	(3)	
97-1-10	Nickel carbonyl; 13463-39-3	(3),(6)	0.1
97-1-11	Nicotine; 54-11-5	(3)	1
97-1-12	Nitrobenzene; 98-95-3	(3)	
97-1-13	Diamidafos; 1754-58-1	(3)	1
97-1-14	Diazinon; 333-41-5	(3),(5)	1
97-1-15	Diafenthuron; 80060-09-9	(2),(5)	
97-1-16	Dialifos; 10311-84-9	(3),(5)	1
97-1-17	WSCP; 31512-74-0	(5)	1
97-1-18	Decamethrin; 52918-63-5	(3),(5)	
97-1-19	Dodine; 2439-10-3	(2),(5)	
97-1-20	Drazoxolon; 5707-69-7	(3),(5)	1
97-1-21	Di-n-butylamine; 111-92-2	(3)	
97-1-22	Dinex; 131-89-5	(3)	0.5
97-1-23	Dinobuton; 973-21-7	(3)	1
97-1-24	Dinoseb; 88-85-7	(3),(5)	1
97-1-25	Dinocap; 39300-45-3	(3)	1
97-1-26	Dinoterb; 1420-07-1	(3)	1
97-1-27	DDT; 50-29-3	(3),(5)	1
97-1-28	Dimetan; 122-15-6	(3)	1
97-1-29	Dimethoate; 60-51-5	(3),(5)	1
97-1-30	Demeton-S-methylsulfone; 17040-19-6	(3)	1
97-1-31	Demeton-methyl; 8022-00-2	(3)	1
97-1-32	Demeton; 8065-48-3	(3),(5)	1
97-1-33	Dimetilan; 644-64-4	(3)	1
97-1-34	Dimethylvinphos; 2274-67-1	(3),(5)	1
97-1-35	Dimefox; 115-26-4	(3)	1
97-1-36	Diquat dibromide; 85-00-7	(3)	1
97-1-37	Disulfoton; 298-04-4	(3),(5)	1
97-1-38	DSP; 3078-97-5	(3)	1
97-1-39	DNOC; 534-52-1	(3)	1
97-1-40	Dieldrin; 60-57-1	(3),(5)	1
97-1-41	DMAB; 74-94-2	(3)	
97-1-42	Dioxabenzofos; 3811-49-2	(3)	1
97-1-43	Dioxacarb; 6988-21-2	(3)	1
97-1-44	Dioxathion; 78-34-2	(3),(5)	1

Table 5-3 (Cont)

List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-45	Isophorone diisocyanate; 4098-71-9	(3)	
97-1-46	Hexamethylene diisocyanate; 822-06-0	(3)	
97-1-47	Dicofol; 115-32-2	(2),(5)	
97-1-48	Dicrotophos; 141-66-2	(3),(5)	1
97-1-49	Dichloroacetic acid; 79-43-6	(1)	
97-1-50	Dichlorvos; 62-73-7	(3),(5)	0.1
97-1-51	Dichlofenthion; 97-17-6	(2),(5)	3
97-1-52	Dithianone;3347-22-6	(2),(5)	
97-1-53	Dithiopyr;97886-45-8	(5)	
97-1-54	Diphacinone; 82-66-6	(3)	1
97-1-55	Difenacoum; 56073-07-5	(3)	1
97-1-56	Difenoconazole; 119446-68-3	(2),(5)	
97-1-57	Lasalocid;25999-31-9	(3)	2
97-1-58	Resmethrin; 10453-86-8	(2),(5)	1
97-1-59	Leptophos; 21609-90-5	(3),(5)	1
97-1-60	Rotenone; 83-79-4	(3),(5)	2
97-1-61	Linuron; 330-55-2	(2),(5)	
97-1-62	HCH; 608-73-1	(3),(5)	1.5
97-1-63	Malathion; 121-75-5	(2),(5)	1
97-1-64	Maleic hydrazide; 123-33-1	(3)	
97-1-65	Malononitrile; 109-77-3	(3)	
97-1-66	Mustard gas; 505-60-2	(3)	0.1
97-1-67	Medinoterb acetate; 2487-01-6	(3)	1
97-1-68	Mercaptoacetic acid; 68-11-1	(3)	
97-1-69	Mecarbam;2595-54-2	(3),(5)	1
97-1-70	Mechlorethamine; 51-75-2	(3)	0.1
97-1-71	Methasulfocarb; 66952-49-6	(3)	1
97-1-72	Methamidophos; 10265-92-6	(3),(5)	1
97-1-73	Methacrylonitrile; 126-98-7	(3),(6)	
97-1-74	Metaldehyde; 108-62-3	(3)	
97-1-75	Methomyl;16752-77-5	(3)	1
97-1-76	Methidathion; 950-37-8	(3),(5)	1
97-1-77	Methiocarb;2032-65-7	(3),(5)	1
97-1-78	Methyl vinyl ketone; 78-94-4	(3),(6)	1
97-1-79	Methyl aphoxide; 57-39-6	(3)	1
97-1-80	[Methyl alcohol;67-56-1]	(3),(6)	
97-1-81	Methyl ethyl ketone; 78-93-3	(3),(6)	
97-1-82	Methyl chloroacetate; 96-34-4	(3)	
97-1-83	Methyl trithion;953-17-3	(3)	1
97-1-84	Methylhydrazine; 60-34-4	(3),(6)	1
97-1-85	Mephosfolan; 950-10-7	(3),(5)	1
97-1-86	Mexacarbate; 315-18-4	(3)	1

Table 5-3 (Cont)

List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-87	Monensin; 17090-79-8	(3)	8
97-1-88	Monocrotophos; 6923-22-4	(3),(5)	1
97-1-89	Molinate; 2212-67-1	(2),(5)	
97-1-90	Inorganic cyanide compounds	(3),(5)	1
97-1-91	Inorganic zinc, salts	(1)	
97-1-92	Inorganic silver, salts	(1)	
97-1-93	Inorganic tin, salts	(1)	
97-1-94	Chromic anhydride; 1333-82-0	(3),(4)	0.1
97-1-95	Vamidithion; 2275-23-2	(3),(5)	1
97-1-96	Fuming sulfuric acid; 8014-95-7	(1)	
97-1-97	Bendiocarb; 22781-23-3	(3),(5)	1
97-1-98	Bensulide; 741-58-2	(2),(5)	
97-1-99	Benzene; 71-43-2	(3),(6)	
97-1-100	Benzeneacetonitrile; 140-29-4	(3)	
97-1-101	Benzoximate; 29104-30-1	(5)	1
97-1-102	Benzidine; 92-87-5	(3)	0.1
97-1-103	Benfuracarb; 82560-54-1	(3)	1
97-1-104	Benfluralin; 1861-40-1	(5)	
97-1-105	Bomyl; 122-10-1	(3)	1
97-1-106	Bronopol; 52-51-7	(5),(2)	1
97-1-107	Brodifacoum; 56073-10-0	(3),(5)	1
97-1-108	Bromadiolone; 28772-56-7	(3)	1
97-1-109	Bromo-2-propanone; 598-31-2	(3),(1)	1
97-1-110	Bromophos-ethyl; 4824-78-6	(3),(5)	1
97-1-111	Bromine; 7726-95-6	(3),(1)	
97-1-112	Bromethalin; 63333-35-7	(3)	1
97-1-113	Methyl bromide; 74-83-9	(3),(5)	1
97-1-114	Hydrogen bromide; 10035-10-6	(1)	1
97-1-115	Butocarboxim; 34681-10-2	(3)	1
97-1-116	Bufencarb; 8065-36-9	(3),(5)	
97-1-117	Blasticidin-S; 2079-00-7	(3)	1
97-1-118	Binapacryl; 485-31-4	(3)	0.1
97-1-119	Arsenic; 7440-38-2	(3)	0.1
97-1-120	Bis(2-ethylhexyl)amine; 106-20-7	(1),(5)	
97-1-121	Bis(2-chloroethyl)ether; 111-44-4	(3)	0.1
97-1-122	Bis(chloromethyl)ether; 542-88-1	(3)	0.1
97-1-123	Bisthiosemi; 39603-48-0	(3)	2
97-1-124	Methylene bithio-cyanate; 6317-18-6	(3)	1
97-1-125	Osmium tetroxide; 20816-12-01	(3)	
97-1-126	Carbon tetrachloride; 56-23-5	(3)	1

Table 5-3 (Cont)

List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-127	Mixture of trihexyl-phosphine oxide, tri-n-octyl phosphine oxide, dioctyl mono-octyl dihexylphosphine oxide	(2),(5)	
97-1-128	Fenbutatin oxide; 13356-08-6	(2),(5)	1
97-1-129	Propylene oxide; 75-56-9	(3),(6)	
97-1-130	Nickel oxides, sulfides	(3)	
97-1-131	Salinomycin; 53003-10-4	(3)	1
97-1-132	Phosphorus trichloride; 7719-12-2	(1)	
97-1-133	Cerezin; 2346-99-8	(3)	1
97-1-134	Selenium; 7782-49-2	(3)	1
97-1-135	Cellocidin; 543-21-5	(3)	1
97-1-136	Sodium hydroxide; 1310-73-2	(1)	5
97-1-137	Potassium hydroxide; 1310-58-3	(1)	5
97-1-138	Triaryl tin hydroxide, salt tributyltin compound	(3),(5)	2
97-1-139	Trialkyl tin hydroxide	(3),(5)	0.1
97-1-140	Mercury; 7439-97-6	(3)	1
97-1-141	Sulfotep; 3689-24-5	(3)	1
97-1-142	Sulprofos; 35400-43-2	(3)	3
97-1-143	Schradan; 152-16-9	(3)	1
97-1-144	[Strychnine; 57-24-9	(3)	1
97-1-145	Cyanamide; 420-04-2	(3)	
97-1-146	Cyclonite; 121-82-4	(3)	1
97-1-147	Cycloheximide; 66-81-9	(3)	0.2
97-1-148	Cyclohexylamine; 108-91-8	(1)	
97-1-149	Cythioate; 115-93-5	(3)	1
97-1-150	Cyprodinil; 121552-61-2	(5)	
97-1-151	Cyprofuram; 69581-33-5	(3)	1
97-1-152	Cyfluthrin; 68359-37-5	(3),(5)	0.5
97-1-153	Cyhalothrin; 68085-85-8	(3),(5)	
97-1-154	Cyhexatin; 13121-70-5	(3),(5)	5
97-1-155	Anabasin; 494-52-0	(3)	1
97-1-156	Aniline; 62-53-3	(3)	
97-1-157	Aminocarb; 2032-59-9	(3)	1
97-1-158	Amidothioate; 54381-26-9	(3)	1
97-1-159	Amiton; 78-53-5	(3),(5)	1
97-1-160	Dinoseb acetate; 2813-95-8	(3)	1
97-1-161	Ethyl acetate; 141-78-6	(6),(3)	
97-1-162	Thallium acetate; 563-68-8	(3)	1
97-1-163	Sodium chlorite; 7758-19-2	(3)	
97-1-164	Azocyclotin; 41083-11-8	(2),(5)	1
97-1-165	Sodium azide; 26628-22-8	(3)	
97-1-166	Azinphos-methyl; 86-50-0	(3),(5)	1

Table 5-3 (Cont)

List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-167	Nitrous acid, salts	(3),(4)	
97-1-168	Acrolein; 107-02-8	(3),(6)	
97-1-169	Acrinathrin; 101007-06-1	(2),(5)	25
97-1-170	Acrylonitrile; 107-13-1	(3),(6)	0.1
97-1-171	Acrylamide; 79-06-1	(3)	0.1
97-1-172	Aphoxide; 545-55-1	(3)	1
97-1-173	Apholate; 52-46-0	(3)	1
97-1-174	Aphidan; 5827-05-4	(3)	5
97-1-175	Antu; 86-88-4	(3)	1
97-1-176	Antimony compounds	(3),(1)	1
97-1-177	Aldoxycarb; 1646-88-4	(3)	1
97-1-178	Aldrin; 309-00-2	(3),(5)	0.1
97-1-179	Aldicarb; 116-06-3	(3)	1
97-1-180	Alanycarb; 83130-01-2	(2),(5)	
97-1-181	Allyxycarb; 6392-46-7	(3)	1
97-1-182	Allyl alcohol; 107-18-6	(3)	
97-1-183	Alkyl aniline	(3)	
97-1-184	Ammonia; 7664-41-7	(1)	10
97-1-185	Edifenphos; 17109-49-8	(3),(5)	2
97-1-186	Ergocalciferol; 50-14-6	(3)	1
97-1-187	Ebivit; 67-97-0	(3)	1
97-1-188	ACTP; 79456-26-1	(2),(5)	
97-1-189	Ethoprophos; 13194-48-4	(3)	1
97-1-190	Ethiofencarb; 29973-13-5	(3)	1
97-1-191	Ethion; 563-12-2	(3),(5)	1
97-1-192	Epichlorohydrin; 106-89-8	(3)	0.1
97-1-193	Endosulfan; 115-29-7	(3),(5)	1
97-1-194	Endothal; 145-73-3	(3)	1
97-1-195	Endothion; 2778-04-3	(3)	1
97-1-196	Endrin; 72-20-8	(3),(5)	1
97-1-197	MNFA; 5903-13-9	(3)	1
97-1-198	Chloric acid, salts	(3),(4)	1
97-1-199	2,3-Epoxypropyltrimethylammonium chloride; 3033-77-0	(3)	0.1
97-1-200	N-Alkyldimethylbenzylammonium chloride	(2),(5)	1
97-1-201	Methyl chloride; 74-87-3	(3),(6)	1
97-1-202	Butyltriphenylphos phonium chloride; 13371-17-0	(3)	
97-1-203	Hydrogen chloride; 7647-01-0	(1)	10
97-1-204	Cyanogen chloride; 506-77-4	(3)	
97-1-205	Ethyl chloride; 75-00-3	(3),(6)	

Table 5-3 (Cont)

List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-206	Chlorphonium chloride; 115-78-6	(3)	1
97-1-207	o-Toluenesulfonyl chloride; 133-59-5	(5),(2)	
97-1-208	Thionyl chloride; 7719-09-7	(1)	
97-1-209	Sulfur chloride; 10025-67-9	(1)	
97-1-210	Omadine; 1121-31-9	(3)	1
97-1-211	Omethoate; 1113-02-6	(3),(5)	1
97-1-212	Phosphorus pentoxide; 1314-56-3	(1)	
97-1-213	Phosphorus pentachloride; 10026-13-8	(1)	
97-1-214	Phosphorus pentasulfide; 1314-80-3	(3),(5)	1
97-1-215	Oxamyl; 23135-22-0	(3)	1
97-1-216	Oxydemeton-methyl; 301-12-2	(3)	1
97-1-217	Oxydeprofos; 2674-91-1	(3)	1
97-1-218	Phosphorus oxychloride; 10025-87-3	(1)	
97-1-219	Warfarin; 81-81-2	(3)	0.1
97-1-220	Methyl iodide; 74-88-4	(3)	0.1
97-1-221	Hydrogen iodide; 10034-85-2	(1)	1
97-1-222	Imidacloprid; 105827-78-9	(3)	
97-1-223	Imibenconazole; 86598-92-7	(5)	
97-1-224	Ibotenic acid; 2552-55-8	(3)	1
97-1-225	Isazofos; 42509-80-8	(3),(5)	1
97-1-226	Isobenzan; 297-78-9	(3),(5)	1
97-1-227	Isobutylamine; 78-81-9	(3),(6)	
97-1-228	Methyl isothiocyanate; 556-61-6	(3)	1
97-1-229	Isouthioate; 36614-38-7	(3)	1
97-1-230	Isofenphos; 25311-71-1	(3)	1
97-1-231	Isofluorophate; 55-91-4	(3)	1
97-1-232	Isoxathion; 18854-01-8	(3)	1
97-1-233	Isolan; 119-38-0	(3)	1
97-1-234	1-[2-[Ethyl[4-[4-[4-[ethyl(2-pyridinoethyl)amino]-2-methylphenylazo]benzoylamino]phenylazo]-3-methylphenyl]amino]ethyl]pyridinium dichloride; 163831-67-2	(2),(5)	
97-1-235	Ioxynil; 1689-83-4	(3)	3
97-1-236	Iprobenfos; 26087-47-8	(3)	1
97-1-237	Ammonium bifluoride; 1341-49-7	(3),(1)	1
97-1-238	EPN; 2104-64-5	(3),(5)	1
97-1-239	Carbon disulfide; 75-15-0	(3),(6)	0.1
97-1-240	White phosphorus; 7723-14-0	(3),(6)	1
97-1-241	Zinc phosphide; 1314-84-7	(3),(6)	1

Table 5-3 (Cont)

List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-242	Aluminum phosphide; 20859-73-8	(3),(5)	1
97-1-243	Zeta cypermethrin; 52315-07-8	(3),(5)	
97-1-244	Ziram; 137-30-4	(3)	1
97-1-245	Thallium nitrate; 10102-45-1	(3)	1
97-1-246	Nitric acid; 7697-37-2	(1),(4)	10
97-1-247	Chinomethionat; 2439-01-2	(2),(5)	
97-1-248	Carguophos; 106870-78-4	(3)	1
97-1-249	Cadusafos; 95465-99-9	(3),(5)	
97-1-250	Cadmium compounds	(3)	
97-1-251	Carbanolate; 671-04-5	(3)	1
97-1-252	Carbaryl; 63-25-2	(2),(5)	5
97-1-253	Carbosulfan; 55285-14-8	(3),(5)	1
97-1-254	Carbophenothion; 786-19-6	(3),(5)	1
97-1-255	Carbofuran; 1563-66-2	(3),(5)	1
97-1-256	Potassium; 7440-09-7	(1),(6)	
97-1-257	Alloy of potassium and sodium; 11135-81-2	(1),(6)	
97-1-258	Cartap; 15263-53-3	(2),(5)	2
97-1-259	Camphechlor; 8001-35-2	(3),(5)	1
97-1-260	Captafol; 2425-06-1	(3),(5)	0.1
97-1-261	Captan; 133-06-2	(3),(5)	0.1
97-1-262	Coumachlor; 81-82-3	(3)	1
97-1-263	Coumatetralyl; 5836-29-3	(3)	1
97-1-264	Coumafuryl; 117-52-2	(3)	1
97-1-265	Coumithoate; 572-48-5	(3)	1
97-1-266	Quinalphos; 13593-03-8	(3),(5)	1
97-1-267	Quinoclamine; 2797-51-5	(2),(5)	1
97-1-268	Cresol; 1319-77-3	(3)	5
97-1-269	Crotoxyphos; 7700-17-6	(3)	1
97-1-270	Crotonaldehyde; 4170-30-3	(3),(6)	1
97-1-271	Chromic acid, salts	(3)	0.1
97-1-272	Crimidine; 535-89-7	(3)	1
97-1-273	Cryolite; 15096-52-3	(3)	1
97-1-274	Xylenol; 1300-71-6	(3)	5
97-1-275	Xylene; 1330-20-7	(3)	
97-1-276	Chloromethyl methyl ether; 107-30-2	(3),(6)	
97-1-277	Chlorosulfonic acid; 7790-94-5]	(1)	
97-1-278	Chloroacetic acid; 79-11-8	(3)	
97-1-279	Chlorothalonil; 1897-45-6	(2),(5)	0.1
97-1-280	Chlorophacinone; 3691-35-8	(3)	0.025
97-1-281	Chloroform; 67-66-3	(3)	

Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-282	Chloropromurite; 5836-73-7	(3)	1
97-1-283	Chloropicrin; 76-06-2	(3)	1
97-1-284	Chlorohydrin; 96-24-2	(3)	1
97-1-285	Chlordan; 57-74-9	(2),(5)	1
97-1-286	Chlordimeform; 6164-98-3 ? 3%	(3)	3
97-1-287	Chlormephos; 24934-91-6	(3)	1
97-1-288	Chlorthiophos; 21923-23-9	(3),(5)	1
97-1-289	Chlorfenvinphos; 470-90-6	(3),(5)	1
97-1-290	Chlorpyrifos; 2921-88-2	(3),(5)	1
97-1-291	Cloethocarb; 51487-69-5	(3)	1
97-1-292	Terbufos; 13071-79-9	(3),(5)	1
97-1-293	Thenylchlor; 96491-05-3	(5)	
97-1-294	Themivinphos; 35996-61-3	(3)	1
97-1-295	Tebufenpyrad; 119168-77-3	(2),(5)	
97-1-296	Tetraalkyl lead	(3)	1
97-1-297	Tetrachloroethylene; 127-18-4	(3)	
97-1-298	Toluene; 108-88-3	(3),(6)	
97-1-299	Toluenediamine	(3)	
97-1-300	Toluidine	(3),(5)	
97-1-301	Tolylfluorid; 731-27-1	(3),(5)	
97-1-302	Tralomethrin; 66841-25-6	(5),(2)	
97-1-303	1,1'-minodi(octamethylene)diguanidinium tris(dodecylbenzenesulfonate); 99257-43-9	(3)	
97-1-304	Triamiphos; 1031-47-6	(3)	1
97-1-305	Triazamate; 112143-82-5	(3),(5)	
97-1-306	Triazophos; 24017-47-8	(3),(5)	1
97-1-307	Trichloronat; 327-98-0	(3),(5)	1
97-1-308	Trichloroacetic acid; 76-03-9	(1)	
97-1-309	Trichloroethylene; 79-01-6	(3)	
97-1-310	Trichlorfon; 52-68-6	(3),(5)	10
97-1-311	Triphenylphosphine; 603-35-0	(2),(5)	
97-1-312	Trifluralin; 1582-09-8	(2),(5)	1
97-1-313	Trifluoroborane; 7637-07-2	(3)	
97-1-314	Triflic acid; 1493-13-6	(1)	1
97-1-315	Thiram; 137-26-8	(2),(5)	
97-1-316	Thionazin; 297-97-2	(3)	1
97-1-317	Thiodicarb; 59669-26-0	(3),(5)	1
97-1-318	Thiometon; 640-15-3	(3)	1
97-1-319	Thiosemicarbazide; 79-19-6	(3)	1
97-1-320	Ethyl thiocyanacetate; 5349-28-0	(3)	1
97-1-321	Thiocyclam; 31895-21-3	(2),(5)	3
97-1-322	Thiofanox; 39196-18-4	(3),(5)	

Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-323	Paraquat, salts	(3)	1
97-1-324	Parathion-methyl; 298-00-0	(3),(5)	1
97-1-325	Parathion; 56-38-2	(3),(5)	1
97-1-326	Famphur; 52-85-7	(3)	1
97-1-327	Tetramethylammonium perfluorooctanenoate	(3)	
97-1-328	Fenamiphos; 22224-92-6	(3),(5)	1
97-1-329	Fenazaquin; 120928-09-8	(3),(5)	
97-1-330	Fenothiocarb; 62850-32-2	(5)	
97-1-331	Fenoxaprop-p; 71283-80-2	(5)	
97-1-332	Phenol; 108-95-2	(3)	5
97-1-333	Fenitrothion; 122-14-5	(2),(5)	
97-1-334	Phenylenediamine; 25265-76-3	(3),(5)	
97-1-335	Phenylhydrazine; 100-63-0	(3),(5)	1
97-1-336	Fenvalerate; 51630-58-1	(3),(5)	1
97-1-337	Fensulfothion; 115-90-2	(3),(5)	1
97-1-338	Phencapton; 2275-14-1	(3),(5)	1.5
97-1-339	Pentachlorophenol; 87-86-5	(3),(5)	1
97-1-340	Phenthoate; 2597-03-7	(2),(5)	3
97-1-341	Fenthion; 55-38-9	(3),(5)	2
97-1-342	Fenpyroximate; 134098-61-6	(3),(5)	25
97-1-343	Fonofos; 944-22-9	(3),(5)	1
97-1-344	Phorate; 298-02-2	(3),(5)	
97-1-345	Formalin; 50-00-0	(3),(5)	1
97-1-346	Formothion; 2540-82-1	(3)	
97-1-347	Formetanate; 22259-30-9	(3),(5)	1
97-1-348	Phosalone; 2310-17-0	(3),(5)	2.2
97-1-349	Phosgene; 75-44-5	(3)	
97-1-350	Phosmet; 732-11-6	(2),(5)	1
97-1-351	Phosacetim; 4104-14-7	(3),(5)	1
97-1-352	Fosthiazate; 98886-44-3	(3)	
97-1-353	Fosthiethan; 21548-32-3	(3)	1
97-1-354	Phosphamidon; 13171-21-6	(3)	1
97-1-355	Phosfolan; 947-02-4	(3),(5)	1
97-1-356	Phosphine; 7803-51-2	(3),(6)	1
97-1-357	Folpet; 133-07-3	(3)	0.1
97-1-358	Furathiocarb; 65907-30-4	(3),(5)	1
97-1-359	Furfural; 98-01-1	(3)	1
97-1-360	Fujithion; 3309-87-3	(3)	1
97-1-361	Promecarb; 2631-37-0	(3)	1
97-1-362	Prothoate; 2275-18-5	(3)	1
97-1-363	Propargite; 2312-35-8	(2),(5)	1
97-1-364	Propaquizafop; 111479-05-1	(2),(5)	

Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-365	Propaphos;7292-16-2	(3)	1
97-1-366	Profenofos;41198-08-7]	(2),(5)	
97-1-367	Propetamphos; 31218-83-4	(3),(5)	1
97-1-368	Propoxur; 114-26-1	(3),(5)	1
97-1-369	Tetramethylammonium hydrogen phthalate; 79723-02-7	(3)	1
97-1-370	Flocoumafen; 90035-08-8	(3),(5)	1
97-1-371	Fludioxonil; 131341-86-1	(5)	
97-1-372	Fluvalinate; 69409-94-5]	(3),(5)	
97-1-373	Flusulfamide; 106917-52-6]	(3),(5)	
97-1-374	Flucythrinate; 70124-77-5	(3),(5)	
97-1-375	Fluazinam; 79622-59-6	(3),(5)	25
97-1-376	Fluorosilicic acid; 16961-83-4	(3),(5)	1
97-1-377	Fluoroboric acid; 16872-11-0	(1)	
97-1-378	Fluoroaceto-p-bromo aniline; 351-05-3	(1)	1
97-1-379	Fluoroacetic acid; 144-49-0	(3)	1
97-1-380	Fluoroacetamide; 640-19-7	(3)	1
97-1-381	Sodium fluoride; 7681-49-4	(3)	
97-1-382	Hydrogen fluoride; 7664-39-3	(3),(1)	1
97-1-383	Sulfuryl fluoride; 2699-79-8	(3)	1
97-1-384	Potassium fluoride; 7789-23-3	(3)	
97-1-385	Pyrazothion;108-35-0	(3)	1
97-1-386	Pyrazoxon; 108-34-9		1
97-1-387	Pyracllofos; 89784-60-1	(2),(5)	25
97-1-388	Tetraethyl pyro-phosphate; 107-49-3	(3),(5)	1
97-1-389	Pyridaben;96489-71-3]	(3),(5)	
97-1-390	Pyriminil;53558-25-1		1
97-1-391	Pirimicarb;23103-98-2	(3),(5)	1
97-1-392	Pyrimitate;5221-49-8	(3)	1
97-1-393	Pirimiphos-ethyl; 23505-41-1	(3),(5)	1
97-1-394	PCBs; 1336-36-3	(2),(5)	0.005
97-1-395	Picric acid; 88-89-1	(3),(7)	
97-1-396	Fipronil; 120068-37-3	(3),(5)	
97-1-397	Piprocetyl, salts	(3)	1
97-1-398	Pindone; 83-26-1	(3)	1
97-1-399	Halogenated hydantoin; 16079-88-2	(2),(5)	1
97-1-400	Halfenprox; 111872-58-3	(3),(5)	
97-1-401	Hexaethyl tetraphos-phate; 757-58-4	(3)	1
97-1-402	Hexachlorocyclopentadiene; 77-47-4	(3)	
97-1-403	Heptachlor; 76-44-8	(3),(5)	6
97-1-404	Heptenophos; 23560-59-0	(3),(5)	1

Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-405	Sulfuric acid; 7664-93-9	(1)	10
97-1-406	Dimethyl sulfate; 77-78-1	(3)	
97-1-407	Diethyl sulfate; 64-67-5	(3)	
97-1-408	Thallium sulfate; 7446-18-6	(3)	1
97-1-409	Hydrazine; 302-01-2	(3)	0.1
97-1-410	Hydrazine hydrate	(1)	25
97-1-411	Hydroxylamine; 7803-49-8	(3)	1
97-1-412	2-Naphthylamine; 91-59-8	(3)	0.1
97-1-413	2,4-D; 94-75-7	(3)	
97-1-414	2,4-Dinitroaniline; 97-02-9	(3)	
97-1-415	2,4-Dinitrophenol; 51-28-5	(3)	
97-1-416	N-(1,3-Dimethylbutyl-N'-phenyl-p-phenylenediamine; 793-24-8	(5)	
97-1-417	p-Dimethylaminobenzenediazo sulfonate; 150-70-9	(3)	1
97-1-418	1,2-Dibromoethane; 106-93-4	(3)	50
97-1-419	1,2-Dibromo-3-chloropropane; 96-12-8	(3)	0.1
97-1-420	2,3-Dibromopropanenitrile; 4554-16-9	(3)	1
97-1-421	3,3-Diacetoxy-1-pro- pene; 869-29-4	(3)	1
97-1-422	O,O-Diethyl O-1-phenyl-3-trifluoromethylpyrazol-5-ylphosphorothioate; 122431-24-7	(2),(5)	
97-1-423	Diphenylmethane 4,4'-diisocyanate; 101-68-8	(2),(5)	
97-1-424	1,1-Dichloro-1-nitroethane; 594-72-9	(3)	1
97-1-425	2,4-Dichloro-6-nitrophenol; 609-89-2	(3)	1
97-1-426	Sodium 4-(2,4 -Dichloro-3-methylbenzoyl)-1,3-dimethyl-5-pyrazolate	(3)	
97-1-427	1,3-Dichloro-2-propanol; 96-23-1	(3)	
97-1-428	1,3-Dichloropropene; 542-75-6	(3)	
97-1-429	2,2'-Dithiobis(benzothiazole); 120-78-5	(3),(5)	
97-1-430	4,4'-Dipyridyl; 553-26-4	(3)	
97-1-431	4-Mercaptophenyl methane sulfonate; 62262-84-4	(3)	
97-1-432	1,1'-Methylenebis[4-isocyanatocyclohexane]; 5124-30-1	(3)	

Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-433	2-Methylpropanenitrile; 78-82-0]	(5)	
97-1-434	1,4-benzoquinone; 106-51-4	(3)	1
97-1-435	2-Butyne-1,4-diol; 110-65-6	(3)	
97-1-436	2-n-Butyl-benzo[d]isothiazol-3-one; 4299-07-4	(1),(5)	
97-1-437	N-Butylpyrrolidine; 767-10-2	(3)	
97-1-438	2-Bromoethanol; 540-51-2	(3)	
97-1-439	1-Bromo-2-chloroeth-ane; 107-04-0	(3)	
97-1-440	4-Bromo-2-(4-chlorophenyl)-1-(ethoxymethyl)-5-(trifluoromethyl)pyrrole-3-carbonitrile; 122453-73-0	(2),(5)	
97-1-441	2-Vinylpyridine; 100-69-6	(3),(6)	
97-1-442	4-vinylpyridine; 100-43-6	(3),(6)	
97-1-443	N,N'-Bis(3-aminopropyl)-1,2-ethane diamin.; 10563-26-5	(3)	
97-1-444	N,N-Bis(2-ethyl hexyl) -[(1,2,4-triazol-1-yl)methyl]amine; 91273-04-0	(1),(5)	1
97-1-445	4-Aminobiphenyl; 92-67-1	(3)	0.1
97-1-446	4-Aminobiphenyl hydrochloride; 2113-61-3	(3)	0.1
97-1-447	p-Aminoazobenzene; 60-09-3	(3)	
97-1-448	m-Aminochlorobenzene; 108-42-9	(3)	
97-1-449	4-Aminopyridine; 504-24-5	(1),(5)	
97-1-450	Amine,tert-alkyl(C=12-14),1-amino-9,10-di hydro-9,10-dioxo-4-(2,4,6-trimethylanilino)-anthracene-2-sulfonic acid	(2),(5)	
97-1-451	N-Alkyl toluidine	(3)	
97-1-452	3-Ethoxypropylamine; 6291-85-6	(2),(5)	
97-1-453	1-Chloro-2-nitropro- pane; 2425-66-3	(3)	1
97-1-454	2-Chlorobenzenamine; 95-51-2]	(2),(5)	
97-1-455	2-Chloroethanol; 107-07-3	(3)	1
97-1-456	14-(2-Chloroethyl)morpholine hydrochloride; 3647-69-6	(3)	
97-1-457	2-Chloropyridine; 109-09-1	(3)	
97-1-458	(E)-N-[(6-Chloro-3-pyridyl)methyl]-N-cyano-N-methylacetamidine;135410-20-7	(3)	

Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
97-1-459	2,2,6,6,-Tetramethyl-4-aminopiperidine reaction product with mixture of dodecyl acrylate and tetradecyl acrylate	(2),(5)	
97-1-460	1,1,2,2-Tetrabromoethane; 79-27-6	(3)	
97-1-461	p-tolyl diiodomethyl sulfone; 20018-09-1	(2),(5)	1
97-1-462	S,S,S-Tributyl phos-phorotrithioate; 78-48-8	(2),(5)	1
97-1-463	2,4,5-T; 93-76-5	(2),(5)	1
97-1-464	2-Propenamide homopolymer reaction products with chloromethane, di-methylamine and formaldehyde; 70750-20-8	(5)	1
97-1-465	N-2-Propenyl-2-pro-pen-1-amine;124-02-7	(3),(6)	
97-1-466	2-Propyn-1-ol; 107-19-7	(3)	
97-1-467	N,N'''-1,6-hexanediylbis(N'-cyanoguanidine) polymer with 1,6-hexanediamine, hydrochloride; 27083-27-8	(5)	
97-1-468	2-Hydrazinoethanol; 109-84-2	(3)	1
97-1-469	Disodium[3-hydroxy-4-[(2-hydroxy-1-naphthyl)azo]-1-naphthalenesulfonato(3-)][1-[[2-hydroxy-5-[(r-methoxyphenyl)azo]phenyl]azo]-2-naphtholato(2-)] chromate(2-); 30785-74-1	(2),(5)	
97-1-470	3-[(Prop-1-en-2-yl) phenyl]prop-2-yl isocyanate; 2094-99-7	(3),(5)	1
97-1-471	13-cis-Retinoic acid ; 4759-48-2	(3)	0.1
97-1-472	4-Mercaptomethyl- 3,6-dithia-1,8-octane dithiol; 131538-00-6	(5)	1
97-1-473	Tefluthrin; 79538-32-2	(3),(5)	1
97-1-474	[1,6-Bis(2,3-epoxypropoxy)naphthalene; 27610-48-6	(3)	1
98-1-475	Dichloro(phenyl) phosphine; 644-97-3	(3)	25
98-1-476	2-Thienylacetonitrile; 20893-30-5	(3)	25
98-1-477	N-(2-Aminoethyl)-1,3-propanediamine; 13531-52-7	(3)	10
98-1-478	Acetone thiosemicar- bazon; 1752-30-3	(3)	1
98-1-479	4,4'-Methylenebis (2-chloroaniline); 101-14-4	(3),(5)	0.1
98-1-480	Tributylamine; 102-82-9	(3)	25
98-1-481	(Epoxyethyl)benzene; 96-09-3	(3)	0.1

Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	Hazardous Picture	%
98-1-482	Nitrofen; 1836-75-5	(3)	0.1
98-1-483	2-Chloroethyldiethyl ammonium chloride; 869-24-9	(3)	25
98-1-484	Fluquinconazole; 136426-54-5	(3),(5)	25
98-1-485	Tebupirimfos; 96182-53-5	(3),(5)	1
98-1-486	Indoxacarb; 173584-44-6	(2),(5)	
98-1-487	Famoxadone; 131807-57-3	(2),(5)	
98-1-488	1,1'-(1,3-Phenylenedi carbonyl)bis(methyl aziridine); 7652-64-4	(3)	1
98-1-489	Ethyl 5,5-diphenyl-2- isoxazoline-3-carboxylate; 163520-33-1	(2),(5)	
99-1-490	1-Methylpropylamine; 13952-84-6	(1),(3),(6)	10
99-1-491	1-Chloro-2-nitro- benzene; 88-73-3	(3)	25
99-1-492	2-Furanmethanol; 98-00-0	(3)	25
99-1-493	Benzyl dimethylocta- decyl ammonium chloride; 122-19-0	(2),(5)	25
99-1-494	(2-Hydroxyethyl) ammonium mercapto- acetate; 126-97-6	(3)	25
99-1-495	3,3,4,4-Tetrachlorotetrahydrothiophene 1,1- dioxide; 3737-41-5	(3),(5)	25
99-1-496	Esfenvalerate; 66230-04-4	(3),(5)	25
99-1-497	Chlorobenzilate; 510-15-6	(2),(5)	1
99-1-498	Tris(2,3-dibromopropyl)phosphate; 126-72-7	(3)	0.1
99-1-499	Permethrin; 52645-53-1	(2),(5)	
99-1-500	4-Nitrotoluene; 99-99-0	(3),(5)	25
99-1-501	Amitrole; 61-82-5	(3),(5)	0.1
99-1-502	PBBs; 59536-65-1	(3)	0.1
99-1-503	3-Dodecyl-1-(2,2,6,6- tetramethyl-4-piperidiny)- 2,5-pyrrolidinedione; 79720-19-7	(1),(5)	10
99-1-504	Phosphorochloridic acid diethyl ester; 814-49-3	(3),(5)	1
99-1-505	Perfluorocyclopentene; 559-40-0	(2)	20
99-1-506	Dichromeic acid; 13530-68-2	(3),(4),(5)	0.1
2000-1-507	Trietramethylammonium 4,5-dihydro-5-oxo-1-(4-sulfophenyl)-4-[(4-sulfophenyl)azo]-1H-pyrazole-3-carboxylate; 131013-81-5	(3)	25
2000-1-508	Propionitrile; 107-12-0	(3),(4)	25
2000-1-509	N-Hexadecyltrimethyl ammonium chloride; 112-02-7	(5),(2)	25
2000-1-510	1,4-Dichloro-3-buten-2-one; 69711-44-0	(3)	1
2000-1-511	2-Hydroxy-4,4'-dichlorodiphenyl ether; 3380-30-1	(2),(5)	25
2000-1-512	N,N-Dimethyl-N-2-propenyl-2-propen-1-aminium reaction products with Sodium tetraphenylborate(1-); 153965-50-5	(5)	25
2000-1-513	Diisopropyl xanthogen polysulphide; 137398-54-0	(2),(5)	25
2000-1-514	1,3-Dihydro-1,3-dioxo-2H-isoindole-2-hexaneperoxic acid; 128275-31-0	(2),(4),(5)	25

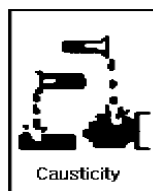
Table 5-3 (Cont) List of toxic chemicals

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

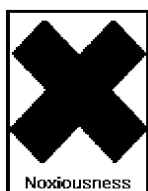
Name of chemicals	Name of chemicals	Name of chemicals	Name of chemicals
2001-1-515	Nonylphenols;25154-52-3,104-40-5,84852-15-3,39-84-4,136-66-9 and 4-tert-Octyphenol;140-66-9	(2),(5)	25
2001-1-516	Sodium dimethyldithiocabamate;128-04-1	(2),(5)	25
2001-1-517	1,2-Dichloroethane;107-06-2	(3),(4)	0.1
2001-1-519	Vinyl chloride;75-01-4	(3),(6)	0.1
2001-1-520	Ethylene oxide;75-21-8	(3),(6)	0.1
2001-1-521	Trichloroacetonitrile; 545-06-2	(3)	25
2001-1-522	2-Methyl-2-propenoylchloride; 920-46-7	(1),(3),(6)	1
2001-1-523	1,1'-(p-Tolylimino) dipropan-2-ol; 38668-48-3	(3)	25
2001-1-524	Hexafluoro-1,3-butadiene; 685-63-2	(3)	25
2001-1-525	1,1,1-Trifluoro-N-[(trifluoromethyl)sulfonyl]methanesulfonamide lithium salt; 90076-65-6	(3)	25
2001-1-526	2,2'-Thiodiethanethiol; 3570-55-6	(3)	1
2001-1-527	1-Cyclohexyl-1H-pyrrole-2,5-dione; 1631-25-0	(3),(5)	1
2001-1-528	N'-[3-(Dimethylamino)propyl]-N,N-dimethylpropane-1,3-diamine; 6711-48-4	(3)	25
2001-1-529	Tetramethylammonium hydroxide; 75-59-2	(3)	25
2002-1-530	Pyridine-triphenylborane(1/1); 971-66-4	(3),(5)	25
2002-1-531	N—[3-(Oxiranylmethoxy)phenyl]-N-(oxiranylmethyl)oxiranemethanamine; 71604-74-5	(3)	1
2002-1-532	N-[2-Methyl-4-(oxiranylmethoxy)phenyl]-N-(oxiranylmethyl)oxiranemethanamine; 110656-67-2	(3)	1
2002-1-533	N-Alkyl(C=8~22)polytrimethylenepolyamines, carboxymethylderivs., sodium salt; 97659-53-5	(5)	25
2002-1-534	1,3-Di-2-propenyl-2-(2-propenyloxy)benzene, epoxidized	(3)	1
2002-1-535	2,2'-[Methylenebis[(2,6-dimethyl-4,1-phenylene)oxymethylene]]bisoxirane; 93705-66-9	(2),(5)	25
2002-1-536	Tetraisocyanatosilane; 3410-77-3	(3)	1
2002-1-537	4-[a-[4-(Dimethylamino)phenyl]benzylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride; 569-64-2	(3),(5)	25
2002-1-538	n-Propylchloroformate; 109-61-5	(3)	25
2002-1-539	Tetramethylammoniumchloride; 75-57-0	(3)	1
2003-1-540	Triethylammoniumfluoride; 73602-61-6	(3),(1)	25

Notes:

Hazardous Pictures



Picture(1)



Picture(2)



Picture(3)



Picture(4)



Picture(5)



Picture(6)



Picture(7)

Table 5-4 List of Monitored chemicals		
No. of Chemicals	Name of chemicals	%
98-2-1	Butylbenzyl phthalate; 85-68-7	
98-2-2	Bis(2-ethylhexyl)phthalate; 117-81-7	
98-2-3	Pentyl~ Nonylphenols	
98-2-4	4,4''''-Bisphenol A; 80-05-7	
98-2-5	Bisphenol A bis(diphenyl phosphate); 5945-33-5	
98-2-6	[1,1''''- Biphenyl]- 4,4''''-diol polymer with (chloromethyl)oxirane; 71296-97-4	
99-2-7	N-Phenyl-1-naphthalamine; 90-30-2	
99-2-8	4,4''''-(1-Methylethylidene)bisphenol polymer with (chloromethyl)oxirane; 25068-38-6	
2001-2-9	2-Chloro-5-(chloromethyl) pyridine; 70258-18-3	1
2001-2-10	2,5-Di-tert-butyl-1,4-phenylenebis(oxymethylene)bisoxirane; 64777-22-6	25
2002-2-11	Hexabromocyclododecane; 25637-99-4, 3194-55-6	25
2002-2-12	4,4'-Carbonylbis-1,2-benzenedicarboxylic acid compd. With 2-methyl-1H-imidazole(1:2); 172140-94-2	25
2003-2-13	3-Methoxybutyl chloroformate; 75032-87-0	25
2003-2-14	Nitrilotriacetic acid; 139-13-9	1

Table 5-5

List of chemicals prohibited from manufacture, import, or use

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	%
99-4-1	Nitrofen; 1836-75-5	0.1
99-4-2	Dialifos; 10311-84-9	1
99-4-3	DDT; 50-29-3	1
99-4-4	Dimethoate; 60-51-5	1
99-4-5	Disulfoton; 298-04-4	5
99-4-6	Dieldrin; 60-57-1	1
99-4-7	Leptophos; 21609-90-5	1
99-4-8	Methamidophos; 10265-92-6	1
99-4-9	Monocrotophos; 6923-22-4	1
99-4-10	Benzidine; 92-87-5	0.1
99-4-11	Lead arsenate; 7784-40-9	0.1
99-4-12	Bis(2-chloroethyl)ether; 111-44-4	0.1
99-4-13	Bis(chloromethyl)ether; 542-88-1	0.1
99-4-14	Strychnine; 57-24-9	1
99-4-15	Thallium acetate; 563-68-8	1
99-4-16	Phenylmercury acetate; 62-38-4	1
99-4-17	Acrinathrin; 101007-06-1	25
99-4-18	Antu; 86-88-4	1
99-4-19	Aldrin; 309-00-2	0.1
99-4-20	Aldicarb; 116-06-3	1
99-4-21	Endosulfan; 115-29-7	1
99-4-22	Endrin; 72-20-8	1
99-4-23	Isobenzan; 297-78-9	1
99-4-24	Aluminium phosphide; 20859-73-8	1
99-4-25	Thallium nitrate; 10102-45-1	1
99-4-26	Camphechlor; 8001-35-2	1
99-4-27	Captafol; 2425-06-1	0.1
99-4-28	Captan; 133-06-2	0.1
99-4-29	Chlorobenzilate; 510-15-6	1
99-4-30	Chloropicrin; 76-06-2	1
99-4-31	Chlordan; 57-74-9	1
99-4-32	Chlordimeform; 6164-98-3	3
99-4-33	Tris(2,3-dibromopropyl)phosphate; 126-72-7	0.1
99-4-34	Trifluralin; 1582-09-8	1
99-4-35	Paraquat, salts	1
99-4-36	Parathion-methyl; 298-00-0	1
99-4-37	Parathion; 56-38-2	1
99-4-38	Phenylmercuric triethanol ammonium borate	1
99-4-39	Pentachlorophenol; 87-86-5	1
99-4-40	Fenpyroximate; 134098-61-6	25

Table 5-5 (cont)

List of chemicals prohibited from manufacture, import, or use.

*Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	%
99-4-41	Phosphamidon; 13171-21-6	1
99-4-42	Fluazinam; 79622-59-6	25
99-4-43	Fluoroacetamide; 640-19-7	1
99-4-44	Pyraclofos; 89784-60-1	25
99-4-45	Pyriminil; 53558-25-1	1
99-4-46	PBBs; 59536-65-1	0.1
99-4-47	PCBs; 1336-36-3.	0.005
99-4-48	HCH; 608-73-1	1.5
99-4-49	Heptachlor; 76-44-8	6
99-4-50	Thallium sulfate; 7446-18-6	1
99-4-51	2-Naphthylamine; 91-59-8	0.1
99-4-52	1,2-Dibromoethane; 106-93-4	50
99-4-53	1,2-Dibromo-3-chloropropane; 96-12-8	0.1
99-4-54	4-Aminobiphenyl; 92-67-1	0.1
99-4-55	2,4,5-T; 93-76-5	1

Table 5-6 List of the management regulated toxic chemicals limited from manufacture, import or use
 *Chemical is regarded as hazardous if its concentrations are more than the listed percentage

No.	Name of chemicals	%
99-5-1	Methyl bromide; 74-83-9	1
99-5-2	Carbon tetrachloride; 56-23-5	1
99-5-3	Trialkyltin hydroxide	0.1
99-5-4	Arsenic pentoxide; 1303-28-2	0.1

Table 5-7 List of bilingual labels and placards form numbers		
FORM NAME	FORM NUMBER	REMARKS
EXPLOSIVE	EA LABEL 124EK	DOT LABEL
EXPLOSIVE 1.4	EA LABEL 118EK	DOT LABEL
BLASTING AGENT 1.5	EA LABEL 126EK	DOT LABEL
EXPLOSIVE 1.6	EA LABEL 125EK	DOT LABEL
FLAMMABLE GAS	EA LABEL 91EK	DOT LABEL
NON-FLAMMABLE GAS	EA LABEL 92EK	DOT LABEL
POISON GAS	EA LABEL 95EK	DOT LABEL
FLAMMABLE LIQUID	EA LABEL 93EK	DOT LABEL
FLAMMABLE SOLID	EA LABEL 94EK	DOT LABEL
SPONTANEOUSLY COMBUSTIBLE	EA LABEL 85EK	DOT LABEL
DANGEROUS WHEN WET	EA LABEL 90EK	DOT LABEL
OXIDIZER	EA LABEL 89EK	DOT LABEL
ORGANIC PEROXIDE	EA LABEL 86EK	DOT LABEL
POISON	EA LABEL 96EK	DOT LABEL
HARMFUL (STOW AWAY FROM FOODSTUFFS)	EA LABEL 127EK	DOT LABEL
INFECTIOUS SUBSTANCE	EA LABEL 133EK	DOT LABEL
RADIOACTIVE I	EA LABEL 130EK	DOT LABEL
RADIOACTIVE II	EA LABEL 131EK	DOT LABEL
RADIOACTIVE III	EA LABEL 132EK	DOT LABEL
CORROSIVE	EA LABEL 87EK	DOT LABEL
CLASS 9	EA LABEL 137	DOT LABEL
EMPTY	EA LABEL 128	DOT LABEL
PACKAGING ORIENTATION	EA LABEL 129	DOT LABEL

Table 5-8 Permissible Standards for Gaseous Toxic Chemicals		
Threshold Limit Value(a) (ppm)	Regulated Quantity (kg/day or m3/day)	Gases
$a \leq 1$	2.5 or 0.25	Phosgene, Phosphine, Formaldehyde, cyanogen chloride
$1 < a \leq 10$	25 or 2.5	Hydrogen cyanide, Hydrogen Iodine, Hydrogen fluoride, Hydrogen bromine, Methyl bromine, Hydrogen chloride,
$10 < a \leq 100$	250 or 25	Ammonia
$100 < a \leq 200$	500 or 50	Methane chloride

Chapter 6 HAZARDOUS WASTE

6-1. SCOPE.

This chapter contains criteria for a comprehensive management program to ensure that HW and Korean designated waste are identified, stored, transported, treated, disposed and recycled in an environmentally-sound manner. This program provides a tracking system for management of HW from generation to ultimate disposal.

6-2. DEFINITIONS.

- a. **Acute Hazardous Waste.** Those wastes listed in Table B.3 with a U.S. EPA waste number with the "P" designator, or those wastes in Table B.3 with hazard code (H).
- b. **Designated Waste.** Wastes that can pose a risk to environment such as waste oil and waste acid; or wastes that can do harm to human health such as infectious wastes and PCBs. A list of designated wastes is provided in Appendix B, Section B-3.
- c. **Disposal.** The discharge, deposit, injection, dumping, spilling, leaking, or placing of any hazardous waste into, or on any land or water so that the waste or constituent thereof may enter the environment. Proper disposal effectively mitigates hazards to human health and the environment.
- d. **DoD Hazardous Waste Generator.** In DoD, a generator is considered to be the installation, or activity on an installation, which produces a hazardous waste.
- e. **Elementary Neutralization.** A process of neutralizing a HW, which is hazardous only because of the corrosivity characteristic. It must be accomplished in a tank, transport vehicle, or container.
- f. **Hazardous Constituent.** A chemical compound that is listed by name in Table B-4 or possesses the characteristics described in Appendix B-1.
- g. **Hazardous Waste (HW).** A discarded material that may be solid, semi-solid, liquid, or contained gas and either exhibits a characteristic of a HW defined in Appendix B, section B-1, or is listed as a HW in Tables B.1 through B.4. Excluded from this definition are domestic sewage sludge, household wastes and medical wastes.
- h. **Hazardous Waste Accumulation Point (HWAP).** A shop, site, or other work center where hazardous wastes are accumulated until removed to a Hazardous Waste Storage Area (HWSA) or shipped for treatment or disposal. A HWAP may be used to accumulate no more than 208 liters (55 gallons) of hazardous waste, or 1 liter (1 quart) of acute hazardous waste, from each waste stream. The HWAP must be at or near the point of generation and under the control of the operator.
- i. **Hazardous waste /designated hazardous waste disposal facility.** A facility where special waste is landfilled, incinerated, destroyed, neutralized, or cement solidified, or intermediately treated for such disposal. In particular, this refers to any one or a combination of the following intermediate and final disposal facilities:
 - (1) Intermediate disposal facility
 - (2) Incineration facility
 - 1. General incineration facility
 - 2. High temperature incineration facility
 - 3. Pyrolysis facility
 - 4. High temperature melting facility
 - 5. Mixed heat disposal facility (a facility that includes more than two of 1. to 4. above)
 - 6. Cement sintering furnace or a melting furnace
 - (b) Mechanical disposal facility

1. Compression facility (more than 10 horsepower)
2. Shredding/pulverization facility (more than 20 horsepower)
3. Cutting facility (more than 10 horsepower)
4. Melting facility (more than 10 horsepower)
5. Gas recovery facility
6. Evaporation/concentration facility
7. A refining facility (a facility which disposes of waste by screening, extracting, filtering, or distilling techniques, etc.).
8. Oil/water separation facility
9. Dewatering/drying facility
10. Sterilization facility
- (c) Chemical disposal facility
 1. Solidification/stabilization facility
 2. Reaction facility (a facility which disposes of waste by chemical reaction such as neutralization, oxidation, reduction, polymerization, condensation, or substitution techniques, etc.)
 3. Coagulation/sedimentation facility
- (d) Biological disposal facility
 1. Making forage/compost/extinction facility
 2. Aerobic/anaerobic decomposition facility
- (3) Final disposal facilities.
 - (a) Isolated landfill.
 - (b) Managed landfill.
- j. **Hazardous Waste Fuel.** Hazardous wastes burned for energy recovery. Fuel produced from hazardous waste by processing, blending or other treatment is also hazardous waste fuel.
- k. **Hazardous Waste Generation.** Any act or process that produces hazardous waste (HW) as defined in this pamphlet.
- l. **Hazardous Waste Log.** A listing of HW deposited and removed from a HWSA. Information such as the waste type, volume, location and storage removal dates should be recorded.
- m. **Hazardous Waste Profile Sheet (HWPS).** A document that identifies and characterizes the waste by providing user's knowledge of the waste, and/or lab analysis, and details the physical, chemical, and other descriptive properties or processes which created the hazardous waste.
- n. **Hazardous Waste Storage Area (HWSA).** Refers to one or more locations on a USFK installation where HW is collected prior to shipment for treatment or disposal. A HWSA may store more than 55 gallons of a HW stream and more than one quart of an acute HW stream.
- o. **Hazardous Waste Storage Area Manager.** A person, or agency, on the installation assigned the operational responsibility for receiving, storing, inspecting, and general management of the installation's HWSA or HWSA program.
- p. **Land Disposal.** Placement in or on the land, including, but not limited to, land treatment, facilities, surface impoundments, underground injection wells, salt dome formations, salt bed formations, underground mines or caves.
- q. **Treatment.** Any method, technique, or process, excluding elementary neutralization, designed to change the physical, chemical, or biological characteristics or composition of any hazardous waste so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.

- r. **Treatment, storage, and disposal facility.** Refers to any facility not located on a USFK installation that is used for the collection, source separation, storage, transportation, transfer, processing, treatment, or disposal of HW.
- s. **Unique Identification Number.** A number assigned to generators of HW to identify the generator and used to assist in tracking the waste from point of generation to ultimate disposal. In USFK, DOD Activity Account Code (DODAAC) will be used.
- t. **Used Oil Burned for Energy Recovery.** Used oil that is burned for energy recovery is termed "used oil fuel." Used oil fuel includes any fuel produced from used oil by processing, blending or other treatment. "Used oil" means any oil or other waste POL product that has been refined from crude oil, or is synthetic oil, has been used, and as a result of such use, is contaminated by physical or chemical impurities. Although used oil may exhibit the characteristics of reactivity, toxicity, ignitability, or corrosivity, it is still considered used oil, unless it has been mixed with hazardous waste. Used oil mixed with hazardous waste is a hazardous waste and will be managed as such.
- u. **USFK HW generator.** In USFK, a generator is considered to be the installation or activity on an installation that produces a regulated HW.

6-3. CRITERIA.

- a. USFK hazardous /designated waste generators.
 - (1) Hazardous waste determination. Generators will identify and characterize the wastes generated at their site using their knowledge of the materials and processes, which generated the waste, or through laboratory analysis of the waste. A HW Profile Sheet (HWPS) will be used to identify each HW stream. The HWPS must be updated by the generator, as necessary, to reflect any new waste streams or process modifications that change the character of the hazardous waste being handled at the storage area.
 - (2) Waste characterization. Generators will identify inherent hazardous characteristics associated with a waste in terms of physical properties (e.g., solid, liquid, contained gases), chemical properties (e.g., chemical constituents, technical or chemical name) and/or other descriptive properties (e.g., ignitable, corrosive, reactive, toxic). The waste characterization shall be IAW U.S. EPA test methods and protocols for HW determination. Korean standard tests can be used as a supplemental characterization method.
 - (3) Each generator will use a DODAAC number for all recordkeeping, reports and manifests for hazardous or designated waste.
 - (4) Pre-transport requirements.
 - (a) Hazardous or designated waste generators will prepare off-installation HW shipments in compliance with applicable requirements in Chapters 5 and 6. USFK organizations will comply with respective requirements in Chapters 5 and 6 when transporting HW, via military vehicle or commercial transportation, on ROK public roads and highways. Requirements may include placarding, marking, containerization, and labeling. Hazardous waste designated for international transport will be prepared IAW applicable international regulations. In the absence of more stringent requirements in Chapters 5 and 6, international standards will be used. The following "vehicle identification of waste collection and transportation" shall be attached to the vehicles for waste collection and transportation.

<p>Certificate No. : Vehicle No. : Types of Waste Transported : Collection/Transportation place : Effective Period . . . ~ . . .</p> <hr/> <p>Waste Collection/Transportation Certificate</p> <hr/> <p>Date . . . Municipal · Provincial Governor or Administrator of the Environmental Administration (signature)</p>	<p>차량증 번호 : 차량번호 : 운반폐기물의 종류 : 수집 · 운반장소 : 유효기간 : 년 월 일 ~ 년 월 일</p> <hr/> <p>폐 기 물 수 집 · 운 반 증</p> <hr/> <p>년 월 일 시 · 도지사(시 · 군 · 구청장) 인 환경관리청장(지방환경관리청장)</p>
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Diameter: 10cm

Ground Color: yellow (white for “temporary vehicles”)

- (b) Manifesting. All hazardous or designated waste leaving the installation will be accompanied by a manifest to ensure a complete audit trail from point of origin to ultimate disposal that will include the information listed below. DD Form 1348-1 (DOD Single Line Item Release/Receipt Document) will be used. This manifest should include:
1. Generator's name, address, and telephone number;
 2. Generator's unique identification number;
 3. Transporter's name, address, and telephone number;
 4. Destination name, address, and telephone number;
 5. Description of waste;
 6. Total quantity of waste;
 7. Date of shipment; and
 8. Date of receipt.
- (c) Generators will maintain an audit trail of hazardous waste from the point of generation to disposal. Generators using DRMS disposal services will obtain a signed copy of the manifest from the initial DRMS recipient of the waste, at which time DRMS assumes responsibility. A generator, as provided in a host-tenant agreement, that uses the hazardous or designated waste management and/or disposal program of a USFK component that has a DODAAC, will obtain a signed copy of the manifest from the receiving component, at which time the receiving component will assume responsibility for subsequent storage, transfer and disposal of the waste. Activities desiring to dispose of their waste outside of the DRMS system will develop their own manifest tracking system to provide an audit trail from point of generation to ultimate disposal. The contractor is required to complete all ROK manifest forms and return completed documents to the government contracting officer's representative and to the generator with the corresponding certificates of disposal.
- (5) Reduce the amount of hazardous generation volume by implementing pollution prevention ideas such as recycling.
 - (6) Collection and transportation requirements for hazardous/designated waste

- (a) Waste pesticides, waste asbestos, and other particulate materials shall be collected and transported after being packed in a polyethylene bag, or the equivalent, to prevent the materials from being scattered, and the cargo compartment of the vehicle transporting the materials shall be covered.
 - (b) When hazardous/designated waste in liquid form is collected and transported, a dedicated tank, container, or piping made for the purpose shall be provided to avoid leakage or overflow.
 - (c) Vehicles used for the collection/transportation of hazardous/designated waste shall be painted with yellow. This requirement does not apply to vehicles only temporarily used for such purpose.
 - (d) Both sides of the cargo compartment of vehicles used for collecting and transporting designated waste shall display signs, or be marked, indicating that they are vehicles being used for collecting and transporting designated waste with the name and phone number of the company. The size of the sign shall be no less than 100 cm in width and 50 cm in height. The letters shall be in black. This will also apply to vehicles temporarily used for such purposes.
- b. Hazardous waste accumulation points (HWAP).
 - (1) A HWAP is defined in subsection 6-2h above. Each HWAP must be designed and operated to provide appropriate segregation for different waste streams, including those that are chemically incompatible. Each HWAP will have warning signs (National Fire Protection Association or appropriate international sign) appropriate for the waste being accumulated at that site.
 - (2) A hazardous waste accumulation point will comply with the storage limits in paragraph 6-2h above. When these limits have been reached, the generator will make arrangements within five working days to move the hazardous waste to a HWSA or ship it off-site for treatment or disposal. Arrangements must include submission of all appropriate turn-in documents to initiate the removal (e.g., DD Form 1348-1A) to appropriate authorities responsible for removing the HW (e.g., DRMO).
 - (3) All criteria of paragraph 6-3d of this chapter, Use and Management of Containers, apply to HWAPs with the exception of 6-3d(1)(e) (weekly inspections).
 - (4) The following provisions of paragraph 6-3e of this chapter, Record keeping Requirements, apply to HWAPs: subparagraphs 6-3e(1) (turn-in document), 6-3e(5)(manifests), and 6-3e(6)(Waste Characterization).
 - (5) Personnel Training. Personnel assigned HWAP duty must successfully complete appropriate hazardous waste training necessary to perform their assigned duties. At a minimum, this must include pertinent waste handling and emergency response procedures. Generic HW training requirements are described in subsection 6-3k of this chapter.
- c. Hazardous Waste Storage Areas (HWSA).
 - (1) Location Standards. To the maximum extent possible, all HWSA will be located to minimize the risk of release due to seismic activity, floods, or other natural events. For facilities located where they may face such risks, the installation spill prevention and control plan must address the risk. Each installation shall give a listing (including site maps) to on-installation emergency authorities (e.g., fire prevention department) and the USFK Environmental Programs Office. The listing shall include information on types and quantities of HW generated or stored.
 - (2) Design and Operation of HWSA. The HWSAs must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned release of hazardous waste or hazardous waste constituents to air, soil,

groundwater or surface water that could threaten human health or the environment. Hazardous waste should not be stored longer than one year in a HWSA.

- (3) Waste Analysis and Verification
 - (a) Waste Analysis Plan. The HWSA manager, in conjunction with the installation(s) served, will develop a plan to determine how and when wastes are to be analyzed. The waste analysis plan will include procedures for characterization and verification testing of both on-site and off-site hazardous waste. The plan should include: parameters for testing and rationale for choosing them, frequency of analysis, test methods, and sampling methods.
 - (b) Maintenance of Waste Analysis File. The HWSA must have, and keep on file, a hazardous waste profile sheet (HWPS) for each waste stream that is stored by each HWSA.
 - (c) Waste Verification. Generating activities will provide identification of incoming waste on the HWPS to the HWSA manager. Prior to accepting the waste, the HWSA manager will:
 - 1. Inspect the waste to ensure it matches the description provided;
 - 2. Ensure that no waste is accepted for storage unless a HWPS is provided, or available and properly referenced;
 - 3. Request a new HWPS from the generator if there is reason to believe that the process generating the waste has changed;
 - 4. Analyze waste shipments in accordance with the waste analysis plan to determine whether it matches the waste description on the accompanying manifest and documents; and
 - 5. Reject shipments that do not match the accompanying waste descriptions unless the generator provides an accurate description.
- (4) Security.
 - (a) General. The installation must prevent the unknowing entry, and minimize the possibility for unauthorized entry, of persons or livestock onto the hazardous waste storage area grounds.
 - (b) Security System Design. An acceptable security system for a HWSA consists of either:
 - 1. A 24-hour surveillance system (e.g. television monitoring or surveillance by guards or other designated personnel) that continuously monitors and controls entry into the hazardous waste storage area; or
 - 2. An artificial or natural barrier (e.g., a securely locked building dedicated for HW storage, a fence in good repair, or a fence combined with a cliff) that completely surrounds the hazardous waste storage area, combined with a means to control entrance at all times (e.g., an attendant, television monitors, locked gate, or controlled roadway access).
 - (c) Required Signs. A sign with the legend "Danger Unauthorized Personnel Keep Out," must be posted at each entrance to the hazardous waste storage area, and at other locations, in sufficient numbers to be seen from any approach to the hazardous waste storage area. The legend must be written in English and Korean, and must be legible from a distance of at least 25 feet. Existing signs with a legend other than "Danger Unauthorized Personnel Keep Out," may be used if the legend on the sign is written in both English and Korean and indicates that only authorized personnel are allowed to enter the hazardous waste storage area, and entry to it can be dangerous.
- (5) Required Aisle Space. Aisle space should be at least 36 inches wide and must allow the unobstructed movement of personnel, fire protection equipment, spill

control equipment, and decontamination equipment to any area of the facility during an emergency. Containers must not obstruct an exit.

- (6) Access to Communications or Alarm System.
 - (a) General. Whenever hazardous waste is being poured, mixed, or otherwise handled, all personnel involved in the operation must have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another person.
 - (b) If there is only one person on duty at the HWSA premises, that person must have immediate access to a device, such as a telephone (immediately available at the scene of operation) or a hand-held two-way radio, capable of summoning external emergency assistance.
- (7) Required Equipment. All HWSAs must be equipped with the following:
 - (a) An internal communications or alarm system capable of providing immediate emergency instruction (voice or signal) to HWSA personnel.
 - (b) A device, such as an intrinsically safe telephone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance from installation security, fire departments, or emergency response teams.
 - (c) Portable fire extinguishers, fire control equipment appropriate to the material in storage (including special extinguishing equipment as needed, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment.
 - (d) Water at adequate volume and pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems (except at facilities where all wastes approved for storage therein are incompatible with water).
 - (e) Readily available personal protective equipment appropriate to the materials stored, eyewash and shower facilities.
 - (f) Testing and Maintenance of Equipment. All HWSA communications alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, must be maintained to ensure its proper operation in time of emergency.
- (8) General Inspection Requirements.
 - (a) General. The installation must inspect the HWSA for malfunctions and deterioration, operator errors, and discharges that may be causing, or may lead to, a release of hazardous waste constituents to the environment or threat to human health. The inspections must be conducted often enough to identify problems in time to correct them before they harm human health or the environment.
 - (b) Types of Equipment Covered. Inspections must include all equipment and areas involved in storage and handling of hazardous waste, including all containers and container storage areas, tank systems and associated piping, and all monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment (such as dikes and sump pumps) that are important to preventing, detecting, or responding to environmental or human health hazards.
 - (c) Inspection Schedule. Inspections must be conducted according to a written schedule that is kept at the HWSA. The schedule must identify the types of problems (e.g., malfunctions or deterioration) that are to be looked for during the inspection (e.g., inoperative sump pump, leaking fitting, eroding dike, etc.).

- (d) Frequency of Inspections. Minimum frequencies for inspecting containers and container storage areas are found in subparagraph 6-3d(1)(e), minimum frequencies for inspecting tank systems are found in subparagraph 6-3h(5)(b). For equipment not covered by those sections, inspection frequency should be based on the rate of possible deterioration of the equipment and probability of an environmental or human health incident if the deterioration or malfunction or any operator error goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, must be inspected daily when in use.
- (e) Remedy of Problems Revealed by an Inspection. When a problem is revealed by an inspection, the installation must remedy any deterioration or malfunction of equipment or structures within a time period that ensures that the problem does not lead to an environmental or human health hazard. Where a hazard is imminent or has already occurred, action must be taken immediately.
- (f) Maintenance of Inspection Records. The installation must record inspections in an inspection log or summary, and keep these records for at least three years from the date of inspection. At a minimum, these records must include the date and time of inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions.
- (9) Personnel Training. Personnel assigned HWSA duty must successfully complete an appropriate hazardous waste training program in accordance with the training requirements in subparagraph 6-3k.
- (10) Storage Practices.
 - (a) Compatible Storage. The storage of ignitable, reactive, or incompatible wastes must be handled so that it does not threaten human health or the environment. Dangers resulting from improper storage of incompatible wastes include generation of extreme heat, fire, explosion and generation of toxic gases.
 - (b) General requirements for ignitable, reactive, or incompatible wastes. The HWSA manager must take precautions to prevent accidental ignition or reaction of ignitable or reactive waste. This waste must be separated and protected from sources of ignition or reaction including but not limited to: open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable or reactive waste is being handled, the HWSA personnel must confine smoking and open flame to specially designated locations. "No smoking" signs, or appropriate icon, must be conspicuously placed wherever there is a hazard from ignitable or reactive waste. The "no smoking" legend must be written in English and Korean. Water reactive waste cannot be stored in the same area as flammable and combustible liquid.
- d. Use and Management of Containers.
 - (1) Container Handling and Storage. To protect human health and the environment, the following guidelines will apply when handling and storing hazardous waste containers.
 - (a) Containers holding hazardous waste will be in good condition, free from severe rusting, bulging or structural defects.
 - (b) Containers used to store hazardous waste, including overpack containers, must be compatible with the materials stored.
 - (c) Management of Containers.

1. A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste.
2. A container holding hazardous waste must not be opened, handled, or stored in a manner that may rupture the container or cause it to leak.
3. Containers of flammable liquids must be grounded when transferring flammable liquids from one container to the other.
- (d) Containers holding hazardous waste will be marked with a hazardous waste marking, and a label indicating the hazard class of the waste contained (i.e., flammable, corrosive, etc.).
- (e) Areas where containers are stored must be inspected weekly for leaking containers, for deterioration of containers and the containment system caused by corrosion or other factors, and for any defects in the secondary containment systems. Secondary containment will be emptied of accumulated releases or retained storm water at least weekly and more frequently during periods of greater precipitation.
- (2) Containment. Container storage areas must have a secondary containment system meeting the following:
 - (a) Must be sufficiently impervious to contain leaks, spills and accumulated precipitation until the collected material is detected and removed.
 - (b) The secondary containment system must have sufficient capacity to contain 10% of the volume of stored containers, or the volume of the largest container, whichever is greater.
 - (c) Storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system as described in 6-3d(2), provided the storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation, or the containers are elevated or are otherwise protected from contact with accumulated liquid.
 - (d) Rainwater captured in secondary containment areas should be inspected and/or tested prior to release. The inspection or testing must be reasonably capable of detecting contamination by the hazardous waste in the containers. Contaminated water shall be treated as hazardous waste until determined otherwise.
- (3) Special Requirements for Ignitable or Reactive Waste. Areas, which store containers holding ignitable or reactive waste, must be located at least 15 meters (50 feet) inside the installation's boundary.
- (4) Special Requirements for Incompatible Wastes.
 - (a) Incompatible wastes and materials must not be placed in the same container.
 - (b) Hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material.
 - (c) A storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device.
- e. Record keeping Requirements.
 - (1) Turn-in documents, e.g., DD Form 1348-1(A) or manifests, must be maintained for three years.
 - (2) Hazardous Waste Log (HWSA, HWAP). A written log will be maintained at the HWSA to record all hazardous waste handled and should consist of the following:
 - (a) Name/address of generator;
 - (b) Description and hazard class of the hazardous waste;
 - (c) Number and types of containers;

- (d) Quantity of hazardous waste;
 - (e) Date stored;
 - (f) Storage location; and
 - (g) Disposition data, to include: dates received, sealed and transported and transporter used. Logs will be maintained until closure of the installation.
- (3) The Hazardous Waste Log will be available to emergency personnel in the event of a fire or spill. Logs will be maintained until closure of the installation.
- (4) Inspection Logs (HWSA, HWAP). Records of inspections should be maintained for a minimum period of three years.
- (5) Manifests (HWSA, HWAP). Manifests of incoming and outgoing hazardous wastes will be retained for three years.
- (6) Waste Analysis/Characterization Records (HWSA, HWAP) will be retained for three years after closure of the HWSA or HWAP.
- (7) Closure plan. Closure plans will be developed before a new HWSA is opened. Each existing HWSA also will develop a closure plan. Concurrent with the decision to close the HWSA the plan will be implemented. The closure plan will include: estimates of the storage capacity of HW, steps to be taken to remove or decontaminate all waste residues, and an estimate of the expected date for closure. See also subparagraph 6-3g.
- (8) Each installation shall report an annual (calendar year) hazardous and designated waste disposal quantity to the USFK EPO by 30 June each year.
- f. Contingency plan.
 - (1) Each installation will have a contingency plan that describes actions to be taken to contain and clean up spills and releases of hazardous waste in accordance with the provisions of Chapter 18.
 - (2) Copies of Contingency Plan. A current copy of the installation contingency plan must be:
 - (a) Maintained at each HWSA and HWAP (HWSAs and HWAPs need maintain only portions of the contingency plan which are pertinent to their facilities and operation.); and
 - (b) Submitted to all police departments, fire departments, hospitals, and emergency response teams identified in the plan, and which the plan relies upon to provide emergency services. Plans should be available in both English and Korean.
- g. Closure (only applies to HWSAs). At closure of a HWSA, hazardous waste and hazardous waste residues must be removed from the containment system including remaining containers, liners, and bases. Closure should be done according to the Closure Plan in a manner that eliminates or minimizes the need for future maintenance or the potential for future releases of hazardous waste.
- h. Tank Systems. The following criteria apply to all storage tanks containing hazardous wastes. See Chapter 19 for criteria dealing with underground storage tanks (UST) containing petroleum, oil and lubricants and hazardous substances.
 - (1) Application. The requirements of this part apply to HWSAs that use tank systems for storing or treating hazardous waste. Tank systems that are used to store or treat hazardous waste that contains no free liquids and are situated inside a building with an impermeable floor are exempted from the requirements in subparagraph 6-3h(4). Tank systems, including sumps that serve as part of a secondary containment system to collect or contain releases of hazardous wastes, are also exempted from the requirements in subparagraph 6-3h(4).
 - (2) Assessment of Existing Tank System's Integrity. For each existing tank system that does not have secondary containment meeting the requirements of

subparagraph 6-3h(4), installations must determine annually whether the tank system is leaking or is fit for use. Installations must obtain, and keep on file at the HWSA, a written assessment of tank system integrity reviewed and certified by a competent authority.

- (3) Design and Installation of New Tank Systems or Components. Managers of HWSAs installing new tank systems or components must obtain a written assessment, reviewed and certified by a competent authority attesting that the tank system has sufficient structural integrity and is acceptable for the storing and treating of hazardous waste. The assessment must show that the foundation, structural support, seams, connections, and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection to ensure that it will not collapse, rupture, or fail.
- (4) Containment and Detection of Releases. In order to prevent the release of hazardous waste or hazardous constituents to the environment, secondary containment that meets the requirements of this section must be:
 - (a) Provided for all new tank systems or components, prior to their being put into service;
 - (b) Provided for those existing tank systems when the tank system annual leak test detects leakage;
 - (c) Provided for tank systems that store or treat hazardous wastes by 1 January 1999;
 - (d) Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the tank system; and capable of detecting and collecting releases and accumulated liquid until the collected material is removed; and
 - (e) Constructed to include one or more of the following: a liner external to the tank, a vault, or double-walled tank.
- (5) General Operating Requirements.
 - (a) Hazardous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, corrode, or otherwise fail.
 - (b) The installation must inspect and log at least once each operating day:
 1. The above-ground portions of the tank system, if any, to detect corrosion or releases of waste;
 2. Data gathered from monitoring and leak detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and
 3. The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).
 - (c) The installation must inspect cathodic protection systems to ensure that they are functioning properly. The proper operation of the cathodic protection system must be confirmed within six months after initial installation and annually thereafter. All sources of impressed current must be inspected and/or tested, as appropriate, or at least every other month. The installation manager must document the inspections in the operating record of the HWSA.
- (6) Response to Leaks or Spills and Disposition of Leaking or Unfit-For-Use Tank Systems. A tank system or secondary containment system from which there has

been a leak or spill, or which is unfit for use, must be removed from service immediately and repaired or closed. Installations must satisfy the following requirements:

- (a) Cessation of use; prevention of flow or addition of wastes. The installation must immediately stop the flow of hazardous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release.
- (b) Containment of visible releases to the environment. The installation must immediately conduct an inspection of the release and, based upon that inspection:
 - 1. Prevent further migration of the leak or spill to soils or surface water;
 - 2. Remove and properly dispose of any contamination of the soil or surface water;
 - 3. Remove free product to the maximum extent possible; and
 - 4. Continue monitoring and mitigating for any additional fire and safety hazards posed by vapors or free products in subsurface structures.
- (c) Make required notifications and reports in accordance with Chapter 18.
- (7) Closure. At closure of a tank system, the installation must remove or decontaminate hazardous waste residues, contaminated containment system components (liners, etc.), contaminated soils to the extent practicable, and structures and equipment.
- i. Standards for the Management of Used Oil.
 - (1) Used Oil Burned for Energy Recovery. Used oil fuel may be burned only in the following devices:
 - (a) Industrial furnaces.
 - (b) Boilers that are identified as follows:
 - 1. Industrial boilers located on the site of a facility engaged in a manufacturing process where substances are transformed into new products, including the component parts of products, by mechanical or chemical processes;
 - 2. Utility boilers used to produce electric power, steam or heated or cooled air or other gases or fluids;
 - 3. Used oil-fired space heaters provided that:
 - a. The heater burns only used oil that a USFK installation generates;
 - b. The heater is designed to have a maximum capacity of not more than 0.5 million BTU per hour; and
 - c. The combustion gases from the heater are properly vented to the ambient air.
 - (2) Prohibitions on Dust Suppression or Road Treatment. Used oil, hazardous waste, or used oil contaminated with any hazardous waste will not be used for dust suppression or road treatment.
- j. Standards for the Management of Lead-Acid Batteries. Lead-acid batteries that are to be recycled will be managed as hazardous material. Lead-acid batteries that are not recycled will be managed as hazardous waste.
- k. Hazardous Waste Training.
 - (1) Application. Personnel and their supervisors that are assigned duties involving actual or potential exposure to hazardous waste must successfully complete an appropriate training program prior to assuming those duties. Personnel assigned to such duty must work under direct supervision until they have completed appropriate training. Additional guidance is contained in DoDI 6050.5, "DoD Hazardous Communication Program".

- (2) Refresher Training. All personnel performing HW duties must successfully complete annual refresher hazardous waste training.
- (3) Training Contents and Requirements. The training program must:
 - (a) Include sufficient information to enable personnel to perform their assigned duties and fully comply with pertinent requirements.
 - (b) Be conducted by qualified trainers who have completed an instructor-training program in the subject, or who have comparable academic credentials and experience.
 - (c) Be designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems.
 - (d) Address the following areas in particular for personnel whose duties include hazardous waste handling and management:
 - 1. Emergency procedures (response to fire/explosion/spills; use of communications/alarm systems; body and equipment clean up);
 - 2. Drum/container handling/storage; safe use of HW equipment; proper sampling procedures;
 - 3. Employee Protection. Personal Protective Equipment (PPE), safety and health hazards, hazard communication, worker exposure; and
 - 4. Record keeping. Record keeping, security, inspections, contingency plans, storage requirements, and transportation requirements.
- (4) Documentation of Training. Installations must document all hazardous waste training for each individual assigned duties involving actual or potential exposure to hazardous waste. Updated training records on personnel assigned duties involving actual or potential exposure to hazardous waste must be kept by the HWSA manager or the responsible installation office and retained for at least three years after termination of duty of these personnel.
- I. Hazardous Waste or Designated Waste Disposal.
 - (1) All USFK hazardous or designated waste should normally be disposed of through the Defense Reutilization and Marketing Service (DRMS). A proposal not to use the DRMS for hazardous waste disposal may be made in accordance with DoD Directive 4001.1, "Installation Management", for best accomplishment of the installation mission, but such proposal shall be approved in writing by the Component Commander, in coordination with DRMO, USACCK, and USFK Engineer, and only after qualified environmental and logistics staffs complete pre-inspections of procedures and prospective contract facilities to verify EGS-compliance. All such installation contracts and disposal criteria must be at least as protective as criteria used by DRMS. Similar procedures will be followed when there is a proposal to initiate burning of hazardous waste fuel or there is any change to the source of hazardous waste fuel being burned.
 - (2) USFK components must ensure that wastes generated by USFK operations which are considered hazardous under either U.S. law or ROK law are not disposed of in the ROK unless the disposal is conducted in accordance with the environmental governing standards and the following:
 - (a) When hazardous wastes cannot be disposed of in accordance with these EGS within the ROK, the HW will be either retrograded to the U.S. or, if permissible under international agreements, transferred to another country outside the U.S. where it can be disposed of in an environmentally-sound manner and in compliance with the environmental governing standards applicable to the country of disposal, if any exist. Trans-shipment of hazardous wastes to another country other than the U.S. for disposal must be approved by, at a

- minimum, the Deputy Under Secretary of Defense for Environmental Security [DUSD(ES)]
- (b) The determination of whether particular USFK-generated hazardous waste may be disposed of in the ROK will be made by the USFK Engineer, in coordination with the Director of Defense Logistics Agency (DLA), or other relevant USFK Components, and the Chief of the U.S. Diplomatic Mission.
- (3) Disposal Procedures
- (a) The determination of whether hazardous wastes may be disposed of in a Republic of Korea facility must include consideration of whether the means of treatment and/or containment technologies employed in the ROK program, as enacted and enforced, effectively mitigate the hazards of such waste to human health and the environment and must consider whether the ROK program includes:
 - 1. An effective system for tracking the movement of hazardous waste to its ultimate destination.
 - 2. An effective system for granting authorization or permission to those engaged in the collection, transportation, storage, treatment, and disposal of HW.
 - 3. Appropriate standards and limitations on the methods that may be used to treat and dispose of HW.
 - 4. Standards designed to minimize the possibility of fire, explosion, or any unplanned release or migration of HW or its constituents to air, soil, surface, or groundwater.
 - (b) The USFK Engineer, in consultation with DLA - Pacific, must also be satisfied, either through reliance on the ROK regulatory system and/or provisions in the disposal contracts, that:
 - 1. All persons and facilities in the waste management process have demonstrated the appropriate level of training and reliability; and
 - 2. Effective inspections, monitoring, and record keeping will take place.
 - (c) In most instances, USFK hazardous or designated waste generating installations or the DRMO will hire contractors for disposal. For hazardous or designated waste processed through DRMO, DRMO will ensure that contractors meet Korean environmental requirements when they dispose USFK hazardous or designated waste at Korean facilities. Where an exception has been granted and hazardous or designated waste is not being processed through DRMO, Installation commanders and contracting officers will ensure that contractors meet Korean environmental requirements when they dispose USFK hazardous or designated waste at Korean facilities.
- (4) General standards for designated waste. When designated waste is solidified with cement, the amount of cement shall be 150 kg/m³ or more (i.e. there will be a minimum of 150 kg of cement in the final waste and cement mixture.)
- (5) Specific standards for each designated waste.
- (a) Waste acid or waste alkali:
 - 1. Waste acid/alkali in liquid form shall be disposed by one of the following methods. However, when the residue after disposal contains substances specified in subparagraph B-3.k. of Appendix B, the residue shall be disposed of in landfill facility after being stabilized or solidified using cement or synthetic polymer.
 - a. Coagulation, sedimentation, filtration, or dewatering after the process of neutralization, oxidization, or reduction.
 - b. Evaporative concentration

- c. Separation, distillation, extraction, and filtration
 2. Waste acid/alkali in solid form shall be disposed of in managed landfill after being uniformly mixed for neutralization, and it shall be disposed of in managed landfill with care not to cause any difficulty to the operation of water barrier facility and leachate disposal facility.
 3. When the mixture of waste acid/alkali and other wastes such as waste oil/waste organic solvent is in liquid form, it shall be disposed of in landfill facility after the treatment of neutralization and incineration (waste from halogenated organic solvents in liquid form shall be disposed of by high temperature incineration). When the mixture is in solid form, it shall be treated so that it does not cause any difficulty for the operation of the water barrier facility and leachate disposal facility.
- (b) Waste oil:
1. Waste oil in liquid form shall be disposed of by one of the following methods:
 - a. After the separation of oil from water, the separated oil shall be disposed of by incineration and the separated water shall be disposed of in the water pollution prevention facility.
 - b. After graduation, the residue shall be disposed of by incineration or stabilization.
 - c. After coagulation and sedimentation, the residues shall be disposed of by incineration.
 - d. It shall be refined by separation, distillation, extraction, filtration, and pyrolysis.
 - e. It shall be incinerated or stabilized.
 2. Waste oil in solid form (tar pitch is excluded) shall be incinerated or stabilized.
 3. Tar pitch shall be disposed of by incineration or disposed of in a managed landfill.
 4. When waste oil is reused, it should meet the following standards.
 - a. The weight of residual carbon shall be 2% or less. By pyrolysis or distillation under reduced pressure, it should be 0.03% or less.
 - b. The volume of water and sediments content shall be 0.5% or less. By pyrolysis or distillation under reduced pressure, it should be 0.02% or less.
 - c. The weight of ash shall be 0.5% or less. By pyrolysis or distillation under reduced pressure, it shall be 0.05% or less.)
 - d. The weight of sulfur shall be 0.55% or less. By pyrolysis or distillation under reduced pressure, it shall be 0.2% or less.
 - e. Cadmium or cadmium compounds shall be 1mg/l or less.
 - f. Lead or lead compounds should be 30 mg/l or less. By pyrolysis or distillation under reduced pressure, it should be 1mg/l or less.
 - g. Chrome or chromium compounds should be 5mg/l or less. By pyrolysis or distillation under reduced pressure, it should be 1mg/l or less.
 - h. Arsenic or arsenic compounds shall be 2mg/l or less. By pyrolysis or distillation under reduced pressure method, it should be 1mg/l or less.
- (c) Waste organic solvents:
1. If the waste with organic solvents includes oil and water that can be separated, the oil and water shall be separated first.
 2. Waste from halogenated organic solvents in liquid form shall be disposed of by one of the following methods:

- a. High temperature incineration.
 - b. After graduation, the residue shall be disposed of by high temperature incineration.
 - c. After separation, distillation, extraction, and filtration, the residue shall be disposed of by high temperature incineration.
 - d. After neutralization, oxidization, reduction, polymerization, coagulation etc., the residue shall be disposed of by high temperature incineration or redispersed of by the methods of coagulation, sedimentation, filtration, and dewatering and the residuals shall be disposed of by high temperature incineration.
3. Waste from halogenated organic solvents in solid form shall be disposed of by high temperature incineration.
 4. Waste organic solvents in liquid form other than the above-mentioned shall be disposed of by one of the following methods:
 - a. Disposal by incineration
 - b. After graduation, the residuals shall be disposed of by incineration.
 - c. After the process of evaporative concentration, the residue shall be disposed of by incineration.
 - d. After separation, distillation, extraction, and filtration, the residuals shall be disposed of by incineration.
 - e. After neutralization, oxidization, reduction, polymerization, and coagulation etc., the residuals shall be disposed of by incineration or redispersed of by the methods of coagulation, sedimentation, filtration, and dewatering, etc. and the residue shall be disposed of by incineration.
 5. Waste organic solvents in solid form other than the above-mentioned shall be disposed of by incineration.
- (d) Waste synthetic polymer:
1. Waste thermo hardening synthetic resin shall be shredded, cut, or melted to the size of 15 cm or less in diameter, and then disposed of in managed landfill.
 2. Waste non-thermo hardening synthetic resin and waste synthetic rubber shall be disposed of by incineration.
- (e) Waste paint and waste lacquer: Waste paint and waste lacquer shall be disposed by high temperature incineration, or processed to remove recyclable substances such as organic solvents followed by disposal of the residue by high temperature incineration.
- (f) Waste asbestos. See additional criteria under paragraph 15-3.
1. For demolition projects, Category I non-friable ACM is not required to be removed prior to demolition if the material is in good condition and is not friable. During the demolition process, the material may be combined with the rest of the demolition debris and disposed of as ordinary construction waste.
 2. Other Category I non-friable ACM waste should be placed in a leak-proof container and labeled (in English and Korean languages) *"This debris complies with ROK Presidential Degree of Solid Waste Management Act, Table 1, Types of Designated Waste (No. 7a). Do Not Crush or Grind Prior To Disposal."* The ACM waste can be disposed of as ordinary construction waste, with the provision that the waste not be subjected to crushing or grinding at the landfill.

3. Waste asbestos not meeting the above descriptions shall be disposed by high temperature melting or solidification.
- (g) Slag, waste casting sand, waste sand, waste fire resistant material, pieces of pottery, or waste catalyst shall be disposed of in managed landfill or disposed of by stabilization or solidification using cement, synthetic polymer, or the equivalent.
- (h) Waste absorbent or waste adsorbent shall be disposed by one of the following methods:
 1. If the waste contains substances that require and are allowed disposal by high temperature incineration, the waste shall be disposed by high temperature incineration.
 2. If the waste contains substances that require and are allowed disposal by general incineration, the waste shall be disposed by general incineration.
 3. It shall be disposed by stabilization or solidification using cement, synthetic polymer or the equivalent (e.g. when heavy metals are included).
- (i) Particulate matter shall be disposed by one of the following methods:
 1. It shall be disposed in a managed landfill after being packed in polyethylene bags or the equivalent.
 2. It shall be disposed by stabilization.
 3. It shall be disposed by solidification using cement, synthetic polymer or the equivalent.
- (j) Incineration ash shall be disposed by one of the following methods:
 1. It shall be disposed in a managed landfill.
 2. It shall be disposed by stabilization.
 3. It shall be disposed by solidification using cement, synthetic polymer or the equivalent.
- (k) Waste pesticide shall be disposed by high temperature incineration or by high temperature melting when it is in liquid form. When it is in solid form, it shall be disposed by the above methods or it shall be disposed in an isolated landfill.
- (l) PCB-containing waste shall be disposed by high temperature incineration or by high temperature melting.
- (m) Sludge shall be disposed by one of the following methods:
 1. It shall be disposed by incineration.
 2. It shall be disposed by solidification using cement, synthetic polymer or the equivalent.
 3. It shall be disposed by stabilization to be less than 85% in water content.
 4. It shall be disposed in the managed landfill to be less than 85% in water content.
- (n) Materials treated by stabilization or solidification shall be disposed in managed landfill.
- (o) Waste hazardous material shall be disposed by one of the following methods:
 1. It shall be disposed by neutralization, hydrolysis, oxidization, or reduction.
 2. It shall be disposed by high temperature incineration.
 3. It shall be disposed by solidification.
- (6) ROK facilities that either store, treat, or dispose USFK-generated hazardous or designated waste must be evaluated and approved by the ROK as being in compliance with their regulatory requirements. This evaluation and approval may consist of having a valid permit or ROK equivalent for the hazardous waste that will be handled.
- (7) Hazardous waste will be recycled or reused to the maximum extent practical. Safe and environmentally acceptable methods will be used to identify, store, prevent

leakage, and dispose hazardous waste in a manner to minimize risks to health and the environment.

- (8) Land disposal requirements. Land disposal of hazardous wastes on USFK installations is prohibited. Land disposal of hazardous wastes off of USFK installations shall only be in facilities approved by the Republic of Korea and after appropriate treatment or stabilization according to ROK environmental laws and standards.
- (9) Incinerator Standards. This section applies to incinerators that incinerate hazardous waste as well as boilers and industrial furnaces that burn hazardous waste for any recycling purposes.
 - (a) Incinerators used to dispose hazardous or designated waste must be licensed or permitted by the ROK Ministry of Environment or approved by the USFK Engineer. On-installation boilers and industrial furnaces for any recycling purposes require USFK Engineer approval. This license, permit, or approval must comply with the criteria listed in subparagraph 6-3.1.(7)(b).
 - (b) A ROK license or permit, or USFK Engineer approval for incineration of hazardous or designated waste shall require the incinerator to be designed to include appropriate equipment as well as to be operated according to management practices (including proper combustion temperature, waste feed rate, combustion gas velocity, and other relevant criteria) so as to effectively destroy hazardous constituents and control harmful emissions. A permitting, licensing, or approval scheme that would require an incinerator to achieve the standards set forth in either of the subparagraphs below is acceptable.
 - 1. The incinerator achieves a destruction and removal efficiency of 99.99% for the organic hazardous constituents that represent the greatest degree of difficulty of incineration in each waste or mixture of waste. The incinerator must minimize carbon monoxide in stack exhaust gas, minimize emission or particulate matter and emit no more than 1.8 Kg (4 pounds) of hydrogen chloride per hour; or
 - 2. The incinerator has demonstrated, as a condition for obtaining a license, permit, or USFK Engineer approval, the ability to effectively destroy the organic hazardous constituents that represent the greatest degree of difficulty of incineration in each waste or mixture of waste to be burned. For example, this standard may be met by requiring the incinerator to conduct a trial burn, submit a waste feed analysis and detailed engineering description of the facility, and provide any other information that may be required to enable the competent ROK authority or the USFK EPO to conclude that the incinerator will effectively destroy the principal organic hazardous constituents of each waste to be burned.
 - (c) Specific standards for disposal facilities.
 - 1. General incinerator facility
 - a. The outlet temperature of combustion chamber shall be 850°C or higher (In case the disposal capacity of combustion chamber is less than 200kg/hr, the temperature shall be 800°C or higher, and 450°C or higher for paper or timber).
 - b. The combustion chamber shall be structured to maintain gas retention time of more than 2 seconds, and shall be easy-to-mix structure (For a chamber with a disposal capacity of less than 200kg/hr, the retention time shall be 0.5 second or longer. For a chamber with a disposal capacity of 200kg/hr or more and less than 2 ton/hr, it shall be more than 1 second). In this case, the retention time shall be calculated from

the converted volume of combustion gas in 850°C (800°C for a chamber with a disposal capacity of less than 200kg/hr, and 450°C for the incineration of paper or timber).

- c. The volatile solids of incineration ash (the content of incombustible material in incineration ash) shall be 10% or less (15% or less for a facility which incinerates wastes other than designated wastes, and has the disposal capacity of less than 200kg/hr). The volatile solids of any domestic waste incinerator that starts operating beginning Jan 1, 2008 shall be less than 5% (10% for the incinerator with a disposal capacity of less than 200kg/hr).
 - d. For a continuous feeding type incinerator without second combustion chamber, a double door shall be provided to prevent outside air from flowing into the combustion chamber. In this case, the temperature of the combustion chamber shall be maintained to be more than outlet standard temperature.
 - e. For a collective feeding type incinerator, a gasification chamber and a combustion chamber which shall be connected to the gasification chamber. The gasification chamber shall not be regarded as a combustion chamber in calculating combustion gas retention time.
2. High temperature incineration facilities.
- a. Outlet temperature of the second combustion chamber shall be 1,100°C or more.
 - b. The second combustion chamber shall be structured to maintain combustion gas retention time of 2 seconds or more. The retention time shall be calculated from the converted volume of combustion gas in 1,100°C.
 - c. The volatile solids of incineration ash generated from the high temperature incineration facility shall be 5% or less.
 - d. It shall have the second combustion chamber connected to the first combustion chamber.
3. Pyrolysis facilities.
- a. Pyrolysis facilities shall be equipped with waste inlet equipment, pyrolysis chamber (including gasification chamber), gas combustion chamber, and heat recovery equipment.
 - b. The outlet temperature of gas combustion chamber shall be 850°C or higher.
 - c. The gas combustion chamber shall be structured to maintain gas retention time of 2 seconds or more. The retention time shall be calculated from the converted volume of combustion chamber in 850°C.
 - d. The volatile solids of incineration ash generated from the pyrolysis chamber shall be 10% or less (15% or less for the facility with a disposal capacity of less than 200kg/hr).
4. High temperature melting facilities.
- a. The outlet temperature of high temperature melting facilities shall be more than 1,200°C.
 - b. The combustion gas retention time of high temperature melting facilities shall be 1 second or more. The retention time shall be calculated from the converted volume of combustion gas in 1,200°C.
 - c. The volatile solids of ash generated from high temperature melting facilities shall be 1% or less.

(10) Standards for Other Physical/Chemical Treatment Facilities:

- (a) Oil and water separation facilities.
 - 1. The facility shall be built to prevent overflow of oil.
 - 2. The facility shall prevent short-circuiting of the flow.
 - 3. The recovered oil storage tank shall be made of corrosion proof material that prevents leakage of used oil.
 - 4. An inlet screen shall be furnished to remove screenings.
 - 5. The facility shall be equipped with an equipment to control the treatment volume.
 - (b) Dewatering facilities.
 - 1. The facility shall have a capacity to reduce water content to 85% or less.
 - 2. The facility shall be equipped to pump wastewater to the wastewater disposal facility.
 - 3. The facility shall have a device to control dewatering volume.
 - 4. The facility shall have a system to prevent liquid waste or wastewater from accidental discharge.
 - (c) Solidification facilities.
 - 1. The facility shall be equipped with a mixer to mix cement, water, and chemicals evenly and to control mixing ratio.
 - a. The facility shall be furnished with curing equipment.
 - (d) Stabilization facilities.
 - 1. The facility shall be provided with equipment to stabilize waste chemically or biologically.
 - a. The facility shall be provided with toxic gas handling equipment
- (11) Treatment Technologies: The following treatment technologies may be used to reduce the volume or hazardous characteristics of wastes. Wastes that are categorized as hazardous waste on the basis of Appendix B-1 and which, after treatment as described herein no longer exhibit any hazardous characteristic, may be disposed as solid waste. Treatment residues of wastes categorized as hazardous under any other section of Appendix B will continue to be managed as hazardous. The treatment technologies listed below are provided as baseline treatment/disposal technologies for use in determining suitability of Korean disposal alternatives. These technologies should not be implemented without consultation with USFK ACoS Engineer.
- (a) Pollution prevention technologies
 - 1. Pollution prevention technologies include material substitution, process change, improved house keeping and hazardous material management that will result in reduction of hazardous waste generation volume and concentrations.
 - 2. Reuse/Recovery: Examples include heat recovery and reuse of used oil.
 - 3. Fuel substitution where the units are operated such that when using the new fuel the destruction of hazardous constituents is at least as efficient as, and hazardous emissions are no greater than those produced with the original fuel.
 - (b) Biological treatment: Wastes are degraded by micro-organisms. Such systems include aerobic, anaerobic, or sequential systems (e.g. anaerobic followed by aerobic).
 - (c) Physical, chemical treatment: Hazardous wastes are destructed by high temperature incineration, vitrification, stabilization/solidification, microwave, ultraviolet, infrared, and laser. In a practical sense, high temperature incineration is the appropriate technology for most of USFK's hazardous wastes. Hazardous wastes are concentrated or separated from water or oil by

absorption, adsorption, membrane process, phase separation, distillation, evaporation, air stripping, critical fluid extraction, liquid extraction etc. for the subsequent treatment or recovery.

- (12) Batteries: Mercury, nickel-cadmium, lithium, and lead-acid batteries will be turned into DRMO for disposal. However, acid can be drained and neutralized if the installation has such facilities.
- (13) POL contaminated soil: If USFK installations need to treat POL contaminated soil, the treatment goal is 800 ppm of total petroleum hydrocarbon.
- (14) Qualifications and management standards.
 - (a) Managers of contract-operated designated waste disposal facilities, whether on or off-post (includes but is not limited to land farms, landfills, distillation and incineration facilities), shall satisfy specific requirements.
 - (b) Installation commanders shall complete a technical evaluation on the acceptability of disposal operations at each facility at least once every two years. Documentation of such inspections shall be retained with other disposal records.

Chapter 7 SOLID WASTE

7-1. SCOPE.

This Chapter contains criteria to ensure that solid wastes (SWs) are identified, classified, collected, transported, stored, treated, and disposed of safely and in a manner protective of human health and the environment. These criteria apply to residential and commercial SW generated at the installation level. These criteria are part of integrated waste management. Policies concerning the recycling portion of integrated waste management are found in DoDI 4715.4, "Pollution Prevention," and service solid waste management manuals. The criteria in this chapter deal with general solid waste. Criteria for specific types of solid waste that require special precautions are located in Chapter 6 (Hazardous Waste), Chapter 8 (Medical Waste), Chapter 14 (PCBs), and Chapter 11 (Pesticides).

7-2. DEFINITIONS.

- a. **Bulk waste.** Large items of SW such as household appliances, furniture, large auto parts, trees, branches, stumps, and other oversize wastes whose large size precludes or complicates their handling by normal SW collection, processing or disposal methods.
- b. **Carry-out collection.** Collection of SW from a storage area proximate to the dwelling unit(s) or establishment where generated.
- c. **Collection.** The act of consolidating SWs (or materials which have been separated for the purpose of recycling) from various locations.
- d. **Collection frequency.** The number of times collection is provided in a given period of time.
- e. **Commercial SW.** All types of SWs generated by stores, offices, restaurants, warehouses, and other non-manufacturing activities, excluding residential and industrial wastes.
- f. **Compactor collection vehicle.** A vehicle with an enclosed body containing mechanical devices that conveys SW into the main compartment of the body and compresses it into a smaller volume of greater density.
- g. **Construction and demolition waste.** The waste building materials, packaging and rubble resulting from construction, alteration, remodeling, repair and demolition operations on pavements, houses, commercial buildings and other structures.
- h. **Curb collection.** Collection of SW placed adjacent to a street.
- i. **Daily cover.** Soil that is spread and compacted or synthetic material that is placed on the top and side slopes of compacted SW at least at the end of each operating day in order to control vectors, fire, moisture, and erosion and to assure an aesthetic appearance. Mature compost or other natural material may be substituted for soil if soil is not reasonably available in the vicinity of the landfill and the substituted material will control vectors, fire, moisture, and erosion and will assure an aesthetic appearance.
- j. **Disposal.** Means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any SW or HW into or on any land or water so that such SW or HW or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwater.
- k. **Final cover.** A layer of soil, mature compost, other natural material (or synthetic material with an equivalent minimum permeability) that is applied to the landfill after completion of a cell or trench, including a layer of material that will sustain native vegetation, if any.

- l.* **Food waste.** The organic residues generated by the handling, storage, sale, preparation, cooking, and serving of foods, commonly called garbage.
- m.* **Generation.** The act or process of producing SW.
- n.* **Hazardous wastes.** Refer to Chapter 6, Hazardous Waste.
- o.* **Industrial SW.** The SW generated by industrial processes and manufacturing.
- p.* **Institutional solid waste.** Solid waste generated by educational, health care, correctional, and other institutional facilities.
- q.* **Land application unit.** An area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for agricultural purposes or for treatment or disposal.
- r.* **Lower explosive limit** - the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25 degrees Celsius and atmospheric pressure.
- s.* **Municipal SW (MSW).** Normally, residential and commercial SW generated within a community, not including yard waste.
- t.* **Municipal Solid Waste Landfill Unit (MSWLF).** A discrete area of land or an excavation, on or off an installation, that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile. A landfill unit also may receive other types of wastes, such as commercial SW and industrial waste.
- u.* **Open burning.** Burning of SWs in the open, such as in an open dump.
- v.* **Open dump.** A land disposal site at which SWs are disposed of in a manner that does not protect the environment, is susceptible to open burning, and is exposed to the elements, vectors and scavengers.
- w.* **Residential SW.** The wastes generated by the normal activities of households, including, but not limited to, food wastes, rubbish, ashes, and bulky wastes.
- x.* **Rubbish.** A general term for SW, excluding food wastes and ashes, taken from residences, commercial establishments and institutions.
- y.* **Sanitary landfill.** A land disposal site employing an engineered method of disposing of SWs on land in a manner that minimizes environmental hazards by spreading the SWs in thin layers, compacting the SWs to the smallest practical volume, and applying and compacting cover material at the end of each operating day.
- z.* **Satellite vehicle.** A small collection vehicle that transfers its load into a larger vehicle operating in conjunction with it.
- aa.* **Scavenging.** The uncontrolled and unauthorized removal of materials at any point in the SW management system.
- bb.* **Service Solid Waste management manual.** Navy NAVFAC MO-213, Air Force AFR 91-8, Army TM 5-634, or their successor documents.
- cc.* **Sludge.** The accumulated semi-liquid suspension of settled solids deposited from wastewaters or other fluids in tanks or basins. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return flows, or other common water pollutants.
- dd.* **Solid waste storage container.** A receptacle used for the temporary storage of SW while awaiting collection.
- ee.* **Stationary compactor.** A powered machine that is designed to compact SW or recyclable materials, and which remains stationary when in operation.
- ff.* **Storage.** The interim containment of solid waste after generation and prior to collection for ultimate recovery or disposal.
- gg.* **Street wastes.** Material picked up by manual or mechanical sweepings of alleys, streets, and sidewalks; wastes from public waste receptacles; and material removed from catch basins.

- hh.* **Transfer station.** A site at which SWs are concentrated for transport to a processing facility or land disposal site. A transfer station may be fixed or mobile.
- ii.* **Vector.** A carrier that is capable of transmitting a pathogen from one organism to another.
- jj.* **Yard waste.** Grass and shrubbery clippings, tree limbs, leaves, and similar organic materials commonly generated in residential yard maintenance (also known as green waste).

7-3. CRITERIA.

- a.* USFK SWs will be treated, stored, and disposed of in facilities that have been evaluated against the subsections 7-3. l, n and o of this chapter. These evaluated facilities will be used to the maximum extent practical.
- b.* Installations will develop and implement a SW management strategy to reduce SW disposal. This strategy could include recycling, composting and waste minimization efforts.
- c.* All SWs or materials which have been separated for the purpose of recycling will be stored in such a manner that they do not constitute a fire, health or safety hazard or provide food or harborage for vectors, and will be contained or bundled so as not to result in spillage.
- d.* Storage of bulky wastes will include, but will not be limited to, removing all doors from large household appliances and covering the items to reduce both the problems of an attractive nuisance, and the accumulation of SW and water in and around the bulky items. Bulky wastes will be screened for the presence of hazardous constituents and ozone depleting substances as defined in Chapter 2. Readily detachable or removable HW will be segregated and disposed of IAW Chapters 6, 14, and 15.
- e.* In the design of all buildings or other facilities that are constructed, modified, or leased after the effective date of these guidelines, there will be provisions for storage IAW these guidelines that which will accommodate the volume of SW anticipated. Storage areas will be easily cleaned and maintained, and will allow for safe, efficient collection.
- f.* Storage containers should be leakproof, waterproof, and vermin-proof, including sides, seams and bottoms and be durable enough to withstand anticipated usage and environmental conditions without rusting, cracking or deforming in a manner that would impair serviceability. Storage containers should have functional lids.
- g.* Containers should be stored on a firm, level, well drained surface which is large enough to accommodate all of the containers and which is maintained in a clean, spillage-free condition.
- h.* Recycling programs will be instituted on USFK installations in accordance with the policies in DoDI 4715.4, "Pollution Prevention and the policies of each service component.
- i.* Installations will not initiate new or expand existing waste landfill units in USFK. If there is a compelling reason to have a landfill, ACoS, Engineer's approval based on justification that unique circumstances mandate a new unit will be required.
- j.* New MSWLF units will be designed and operated in a manner that incorporates the following broad factors:
 - (1) Location restrictions in regard to airport safety (i.e., bird hazards), floodplains, wetlands, aquifers, seismic zones, and unstable areas.
 - (2) Procedures for excluding HW.
 - (3) Cover material criteria (e.g., daily cover), disease vector control, explosive gas control, air quality criteria (e.g., no open burning), access requirements, liquids restrictions and record keeping requirements.
 - (4) Inspection program.

- (5) Liner and leachate collection system designed consistent with location to prevent groundwater contamination that would adversely affect human health.
- (6) A groundwater monitoring system unless the installation operating the landfill, after consultation with the Environmental Executive Agent, determines that there is no reasonable potential for migration of hazardous constituents from the MSWLF to the uppermost aquifer during the active life of the facility and the post-closure care period.
- k. MSWLFs will not be operated on any real estate granted to USFK. Contracting officers and contracting officer's representatives will ensure that MSWLFs operated off of US installations meet the following guidelines:
 - (1) Use standard sanitary landfill techniques of spreading and compacting SWs and placing daily cover over disposed SW at the end of each operating day.
 - (2) Establish criteria for unacceptable wastes based on site-specific factors such as hydrology, chemical and biological characteristics of the waste, available alternative disposal methods, environmental and health effects, and the safety of personnel.
 - (3) Implement a program to detect and prevent the disposal of HWs, infectious wastes, PCB wastes, and wastes determined unsuitable for the specific MSWLF.
 - (4) Investigate options for composting of MSW as an alternative to landfilling or treatment prior to landfilling.
 - (5) Prohibit open burning, except for infrequent burning of agricultural wastes, silvicultural wastes, land-clearing debris, diseased trees, or debris from emergency clean-up operations.
 - (6) Develop procedures for dealing with yard waste and construction debris that keeps it out of MSWLF units to the maximum extent possible (e.g., composting, recycling).
 - (7) Operate in a manner to protect the health and safety of personnel associated with the operation.
 - (8) Maintain conditions that are unfavorable for the harboring, feeding and breeding of disease vectors.
 - (9) Ensure that methane gas generated by the MSWLF unit does not exceed 25% of the lower explosive limit for methane in structures on or near the MSWLF.
 - (10) Operate in an aesthetically-acceptable manner.
 - (11) Operate in a manner to protect aquifers.
 - (12) Control public access to landfill facilities.
 - (13) Prohibit the disposal of bulk or non-containerized liquids if possible.
 - (14) Maintain records on the preceding criteria.
- l. During closure and post-closure operations of landfills may have been operated in the past, installations will--
 - (1) Install a final cover system that is designed to minimize infiltration and erosion.
 - (2) Ensure that the infiltration layer is comprised of a minimum of 46 cm (18 inches) of earthen material, geotextiles, or combination thereof, that have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than .00005 cm/sec, whichever is less.
 - (3) Ensure that the final layer consists of a minimum of 21 cm (8 inches) of earth material that is capable of sustaining native plant growth.
 - (4) If possible, revegetate the final cap with native plants that are compatible with the landfill design, including the liner.
 - (5) Prepare a written closure plan that includes, at a minimum, a description of the monitoring and maintenance activities required to ensure the integrity of the final cover, a description of the planned uses of the site during the post-closure period,

plans for continuing (during the post-closure period) leachate collection, ground-water monitoring, and methane monitoring, and a survey plot showing the exact site location. The plan will be kept as part of the installation's permanent records. Post closure period will be a minimum of five (5) years.

- m. Open burning will not be the regular method of SW disposal. Where burning is the method, incinerators meeting air quality requirements in Chapter 2 will be used.
- n. Composting facilities which process annually 5,000 tons or more of sludge from a municipal wastewater treatment plant are not permitted on USFK installations (see Chapter 4). If USFK Installations' contractors treat sludge at such facilities, Installation Commanders, contract officers, and their representatives will ensure the contractors meet the following guidelines:
 - (1) Operators must maintain a record of the characteristics of the waste composted, sewage sludge and other materials, such as nutrient or bulking agents being composted including the source and volume or weight of the material.
 - (2) Access to the facility must be controlled. All access points must be secured when the facility is not in operation.
 - (3) By-products, including residuals and materials that can be recycled, must be stored to prevent vector intrusion and aesthetic degradation. Materials that are not composted must be removed periodically.
 - (4) Run-off water that has come in contact with composted waste, materials stored for composting, or residual waste must be diverted to a leachate collection and treatment system.
 - (5) The temperature and retention time for the material being composted must be monitored and recorded.
 - (6) Periodic analysis of the compost must be completed for the following parameters: percentage of total solids, volatile solids as a percentage of total solids, pH, ammonia, nitrate nitrogen, total phosphorous, cadmium, chromium, copper, lead, nickel, zinc, mercury and polychlorinated biphenyls.
 - (7) Compost must be produced by a process to further reduce pathogens. Two such acceptable methods are--
 - (a) Windrowing, which consists of an unconfined composting process involving periodic aeration and mixing such that aerobic conditions are maintained during the composting process.
 - (b) The enclosed vessel method, which involves mechanical mixing of compost under controlled environmental conditions. The retention time in the vessel must be at least 72 hours with the temperature maintained at 55 degrees Celsius. A stabilization period of at least seven days must follow the decomposition period.
- o. Classification and use of compost. Installation Commanders, contracting officers, and their representatives will ensure contractor's compost produced from 5,000 tons or more of USFK sludge annually (See Chapter 4), must be classified as "Class A" or "Class B" based on the guidelines below and, depending on this classification, shall be subject to certain use restrictions.
 - (1) Class A compost must be stored until the compost is matured, i.e., 60 percent decomposition has been achieved. Class A compost may contain contaminant levels no greater than the levels indicated below. The compost must be stabilized and contain no greater amounts of inert material than indicated. Allowable average contaminant concentrations in milligrams per kilogram on a dry weight basis are--

(a) PCB	1
(b) Cadmium	10
(c) Chromium	1,000

- | | |
|-------------|-------|
| (d) Copper | 500 |
| (e) Lead | 500 |
| (f) Mercury | 5 |
| (g) Nickel | 100 |
| (h) Zinc | 1,000 |
- (2) Class B compost consists of any compost generated which fails to meet Class A standards.
 - (3) Compost distribution and end use.
 - (a) Class A compost may be distributed for unrestricted use, including agricultural applications.
 - (b) Class B compost may not be distributed for agricultural applications.
 - p. Prohibition of open dumping. No one shall dump any waste at other than waste collection or disposal points.
 - q. Installation Commanders and their contractors will not landfill raw food waste from dining facility serving 100 or more customers daily. The food waste will be incinerated, composted, converted for animal feed, or destructed; and the residual from these processes shall be landfilled. Treatment goals are: moisture content of less than 25 % for heat drying and less than 40 % for composting, conversion to animal feed, or destruction processes.
 - r. Collection and storage of food waste. Food waste is collected and transported by a vehicle with a sealed container to prevent offensive odor or leak of wastewater. The vehicles and containers shall be washed or sterilized.

Chapter 8 MEDICAL WASTE MANAGEMENT

8-1. SCOPE.

This chapter contains criteria for the management of medical waste at USFK medical, dental, research and development and, veterinary facilities generated in the diagnosis, treatment or immunization of human beings or animals or in the production or testing of biologicals subject to certain exclusions. This also includes mixtures of medical waste and hazardous waste. It does not apply to what would otherwise be household waste.

8-2. DEFINITIONS.

- a. **Infectious agent.** Any organism (such as a virus or a bacterium) that is capable of being communicated by invasion and multiplication in body tissues and capable of causing disease or adverse health impacts in humans.
- b. **Infectious hazardous waste.** Mixtures of infectious medical waste and hazardous waste to include solid waste such as fluids from a parasitology laboratory.
- c. **Infectious medical waste.** Solid waste produced by medical and dental treatment facilities which is specially managed because it has the potential for causing disease in man and may pose a risk to both individuals or community health if not managed properly, and which includes the following classes:
 - (1) Microbiology waste, including cultures and stocks of etiologic agents which, due to their species, type, virulence, or concentration are known to cause disease in humans.
 - (2) Pathology waste, including human tissues and organs, amputated limbs or other body parts, fetuses, placentas, and similar tissues from surgery, delivery or autopsy procedures. Animal carcasses, body parts, blood and bedding are also included.
 - (3) Human blood and blood products (including serum, plasma, and other blood components), items contaminated with liquid or semi-liquid blood or blood products and items saturated or dripping with blood or blood products, and items caked with blood or blood products, that are capable of releasing these materials during handling.
 - (4) Potentially infectious materials including human body fluids such as semen, vaginal secretions, cerebrospinal fluid, pericardial fluid, pleural fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids.
 - (5) Sharps, including hypodermic needles, syringes, biopsy needles and other types of needles used to obtain tissue or fluid specimens, needles used to deliver intravenous solutions, scalpel blades, pasteur pipettes, specimen slides, cover slips, glass petri plates, and broken glass potentially contaminated with infectious waste.
 - (6) Infectious waste from isolation rooms, but only including those items which were contaminated or likely to be contaminated with infectious agents or pathogens to include excretion exudates and discarded materials contaminated with blood.
- d. **Noninfectious medical waste.** Solid waste created that does not require special management because it has been determined to be incapable of causing disease in man or which has been treated to render it noninfectious.
- e. **Solid waste.** Any solid waste as defined in Chapter 7, Solid Waste Management.

- f. **Treatment.** Any method, technique or process designed to change the physical, chemical, or biological character or composition of any infectious hazardous or infectious waste so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. Treatment methods for infectious waste must eliminate infectious agents so that they no longer pose a hazard to persons who may be exposed.

8-3. CRITERIA.

- a. Infectious medical waste will be separated, if practical, from other solid waste at the point of origin.
- b. Mixtures of infectious medical wastes and hazardous wastes will be handled as infectious hazardous waste under DoD 4160.21M and are the responsibility of the generating DoD Component. Priority will be given to the hazard that presents the greatest risk. Defense Reutilization and Marketing Offices (DRMOs) have no responsibility for this type of property until it is rendered noninfectious as determined by the USFK medical personnel.
- c. Solid waste that is classified as a hazardous waste in accordance with Appendix B will be managed in accordance with the criteria in **Chapter 6**.
- d. Mixtures of other solid waste and infectious medical waste will be handled as infectious medical waste.
- e. Radioactive medical waste will be managed in accordance with Service Directives.
- f. Infectious medical waste will be segregated, transported and stored in bags or receptacles a minimum of 3 mils thick having such durability, puncture resistance and burst strength as to prevent rupture or leaks during ordinary use.
- g. All bags or receptacles used to segregate, transport or store infectious medical waste must be red or must have the labels in both English and Korean as shown in Figures 8.1 (a) and (b). The requirements for these labels are; size should be bigger than 10 cm long and 6 cm high, background color in yellow, and letters in red.

Handle with cautions !	
Infectious waste inside	
Type of medical waste	
Date of packing	
○○ Medical personnel	

(a) in English

이 물건은 감염성이 있으니 취급에 주의하시기 바랍니다	
적출물의 종류	
포장연월일	
○○병(의)원장	

(b) in Korean

Figure 8.1 Packing Label for infectious medical waste ?

- h.* Sharps will only be discarded into rigid receptacles. Needles shall not be clipped, cut, bent or recapped before disposal.
- i.* Infectious medical waste will be transported and stored to minimize human exposure, and will not be placed in chutes or dumbwaiters.
- j.* Infectious medical waste will not be compacted unless converted to noninfectious medical waste by treatment as described in subsection 8-3o. Containers holding sharps will not be compacted.
- k.* All anatomical pathology waste (i.e., large body parts) must be placed in containers lined with plastic bags that comply with subsection 8-3f, and may only be disposed of by burial after being treated for disposal by incineration or cremation.
- l.* Blood, blood products and other liquid infectious wastes will be handled as follows:
 - (1) Bulk blood or blood products may only be decanted into clinical sinks and the emptied containers will continue to be managed as infectious medical waste.
 - (2) Suction canister waste from operating rooms will either be decanted into a clinical sink or will be sealed into leak-proof containers and incinerated.
- m.* All personnel handling infectious medical waste will wear appropriate protective apparel or equipment such as gloves, coveralls, mask, and goggles sufficient to prevent the risk of exposure to infectious agents or pathogens.
- n.* If infectious medical waste cannot be treated on-site, it will be managed during storage as follows:
 - (1) Infectious medical waste will be maintained in a nonputrescent state, using refrigeration as necessary.
 - (2) Infectious medical waste with multiple hazards (i.e., infectious hazardous waste, or infectious radioactive waste) will be segregated from the general infectious waste stream when additional or alternative treatment is required.
 - (3) Infectious medical waste must not be stored more than 16 days. ?
- o.* Storage sites must be:
 - (1) Specifically designated;
 - (2) Constructed to prevent entry of insects, rodents and other pests;
 - (3) Prevent access by unauthorized personnel; and
 - (4) Marked on the outside with the universal biohazard symbol and the word "BIOHAZARD" in both English and Korean.
 - (5) Structured to prevent any leakage from infiltrating into ground. ?
 - (6) Constructed to prevent discharge of offensive odor. ?
 - (7) Disinfected once a week as a minimum. ?
- p.* Bags and receptacles containing infectious medical waste must be placed into rigid or semi-rigid, leak-proof containers before being transported off-site.
- q.* Infectious medical waste must be treated in accordance with Table 8-1 and the following before disposal:
 - (1) Sterilizers must maintain the temperature at 121° C (250° F) for at least 30 minutes at 15 psi.
 - (2) The effectiveness of sterilizers must be checked at least weekly using *Bacillus stearo thermophilus* spore strips or an equivalent biological performance test.
 - (3) Incinerators used to treat medical waste must be designed and operated to maintain a minimum temperature and retention time sufficient to destroy all infectious agents and pathogens, and must meet applicable criteria in Chapter 2 for air emissions.
 - (4) Ash or residue from the incineration of infectious medical waste must be assessed for classification as hazardous waste in accordance with the criteria in Chapter 6. Ash that is determined to be hazardous waste must be managed in accordance

- with Chapter 6. All other residue will be disposed of in a landfill that complies with the criteria of Chapter 7.
- (5) Chemical disinfection must be conducted using procedures and compounds approved by the USFK medical personnel for use on any pathogen or infectious agent suspected to be present in the waste.
 - r. Installations will develop contingency plans for treatment or disposal of infectious medical waste in the event the primary means become inoperable.
 - s. Spills of infectious medical waste will be cleaned up as soon as possible in accordance with the following:
 - (1) Response personnel must comply with subsection 8-3m.
 - (2) Blood, body fluid and other infectious fluid spills must be removed with an absorbent material that must then be managed as infectious medical waste.
 - (3) Surfaces contacted by infectious medical waste must be washed with soap and water and chemically decontaminated in accordance with paragraph 8-3r(5).
 - t. Installations will keep records, for at least three years after the date of disposal, of the following information concerning infectious medical waste:
 - (1) Type of waste;
 - (2) Amount of waste (volume or weight);
 - (3) Treatment, if any, including date of treatment; and
 - (4) Disposition, including date of disposition, and if the waste is transferred to host nation facilities, receipts acknowledging paragraphs 8-3u(1) – 8-3u(3) for each transfer.

Table 8-1 Treatment and Disposal Methods for Infectious Medical Waste		
Type of Medical Waste	Method of Treatment	Method of Disposal
Microbiological	¹ Steam sterilization	² Municipal solid waste landfill (MSWLF)
	Chemical disinfection	MSWLF
	Incineration	MSWLF
Pathological	³ Incineration	MSWLF
	³ Cremation	Burial
	⁴ Chemical Sterilization	⁵ Domestic wastewater treatment plant (DWTP)
Bulk blood & suction canister waste	⁴ Steam sterilization	DWTP
	⁶ Steam sterilization	DWTP
	⁶ Incineration	MSWLF
Sharps in sharps containers	Steam sterilization	MSWLF
	Incineration	MSWLF

Notes

1. Preferred method for cultures and stocks because they can be treated at point of generation
2. See Chapter 7 for criteria for solid waste landfills.
3. Anatomical pathology waste (i.e., large body parts) must be treated either by incineration or cremation prior to disposal.
4. This only applies to placentas, small organs and small body parts which may be steam sterilized or chemically sterilized, ground, and discharged to a domestic wastewater treatment plant.
5. See Chapter 4 for criteria for domestic wastewater treatment plants.
6. Bulk blood or suction canister waste known to be infectious must be treated by incineration or steam sterilization before disposal.

Chapter 9 PETROLEUM, OIL AND LUBRICANTS

9-1. SCOPE.

This chapter contains criteria to control and abate pollution resulting from the storage, transport and distribution of petroleum products. Criteria for Underground Storage Tanks (USTs) containing POL products are addressed in Chapter 19.

9-2. DEFINITIONS.

- a. **Bulk storage tanks.** Refers to field-constructed tanks, usually having a capacity greater than 190,000 liters (50,000 gallons), and constructed above or below ground.
- b. **Competent agency, authority, individual, official, person, etc.** The term competent as a modifier in these instances refers to an agency, authority, individual, official, person, etc., which/who is: specially designated as competent by these EGS, specifically designated as competent by the authority of the U.S. or ROK government, specifically designated as competent or meets the qualifications of competency of a recognized U.S. or ROK trade organization or association; or, based on experience, training and/or authority granted per DoD/component policy or regulations is judged by the responsible commander to be a capable and appropriate organization/individual to accomplish the task in question.
- c. **Field-constructed tank.** Any tank assembled piece by piece in the field, such as a welded steel or concrete tank.
- d. **Petroleum Storage Facility that can cause soil contamination.** An installation that has fuel storage tanks with total capacity, excluding portable storage, of greater than or equal to 20,000 liters (5,280 gallons).
- e. **Pipeline facility.** Includes new and existing pipes, pipeline rights of way, auxiliary equipment (e.g., valves, manifolds, etc.), and buildings or other facilities used in the transportation of POL.
- f. **POL.** Refined petroleum, oils and lubricants.
- g. **POL facility.** An installation with any individual above ground tank of 2,500 liters (660 gallons) or greater; aggregate above-ground storage of 5,000 liters (1,320 gallons) or greater; UST storage of greater than 159,000 liters (42,000 gallons); or a pipeline facility as identified in subparagraph 9-2d.
- h. **Storage tank.** A fixed container designed to store POL.
- i. **Underground storage tank (UST).** Any tank including underground piping connected thereto, larger than 420 liters (110 gallons), that is used to contain POL products or hazardous substances and the volume of which, including the volume of connected pipes, is 10 percent or more beneath the surface of the ground, but does not include:
 - (1) Tanks containing heating oil used for consumptive use on the premises where it is stored.
 - (2) Septic tanks.
 - (3) Stormwater or wastewater collection systems.
 - (4) Flow through process tanks.
 - (5) Surface impoundments, pits, ponds or lagoons.
 - (6) Field constructed tanks.
 - (7) Hydrant fueling systems.
 - (8) UST containing "de minimus" concentrations of regulated substances.
 - (9) Emergency spill or overflow containment UST systems that are expeditiously emptied after use.

- (10) Storage tanks located in an accessible underground area (such as a basement or vault) if the storage tank is situated upon or above the surface of the floor.
- j. **U.S. industry standards.** Those standards adopted by independent professional organizations, including, but not limited to, American Society for Testing and Materials, American National Standards Institute, American Petroleum Institute, National Association of Corrosion Engineers, National Fire Protection Association and Underwriters Laboratories.

9-3. CRITERIA.

- a. All installations will maintain an inventory of fuel and hazardous material storage tanks.
- b. Spill plans. Each installation will have a spill plan to manage spills and releases at all POL facilities. Criteria for these plans are found in Chapter 18 of this pamphlet. These plans must be written specifically for each POL storage and distribution facility, certified by a competent authority, and updated at least every five years, or when there are significant changes to operations.
- c. General tank provisions. All POL above-ground bulk storage tanks must meet the following requirements:
 - (1) All above-ground bulk POL storage tanks must be double walled with interstitial monitoring or be provided with a secondary means of containment (dike and basin) for the entire contents plus sufficient freeboard to allow for precipitation and expansion of product.
 - (2) Maximum permeability for containment areas will be 10^{-7} cm/sec.
 - (3) Drainage of storm waters from diked areas will be controlled by a valve that is locked closed when not in active use.
 - (4) Before draining storm waters from diked areas they will be inspected for petroleum sheen. If a petroleum sheen is present it must be collected with absorbent material prior to drainage, or treated using an oil-water separator. Disposal of absorbent material exhibiting the hazardous characteristics in Appendix B will be IAW Chapter 6 of this pamphlet.
 - (5) Underground fuel piping connecting to fuel storage tanks will be double-walled piping meeting US industry standards.
- d. If an installation has fuel storage tanks with total capacity, excluding portable storage, of greater than or equal to 20,000 liters (5,280 gallons), the installation shall be considered as a Petroleum Storage Facility that can cause soil contamination? Installations meeting that criteria shall meet the standards for underground storage tanks in Para 19-3.c. and Para 19-3.d., and meet the standards for above-ground tanks in Para 9-3.c. ?
- e. Additional tank wastes provisions. POL tank cleaning wastes frequently have hazardous characteristics (as defined in Appendix B, section B-1). Such wastes must be handled and disposed of according to the requirements of Chapter 6 of this pamphlet. These wastes and handling procedures include:
 - (1) Tank cleaning wastes (sludge and washwaters) will be disposed of in accordance with the criteria of Chapter 6 of this Guide, unless testing confirms they do not have hazardous characteristics as defined in Appendix B, Section B-1.
 - (2) Tank bottom waters, which are periodically drained from bulk storage tanks, will be collected and disposed of in accordance with Chapter 6 of this Guide, unless testing confirms they do not have hazardous characteristics. If they do not have hazardous waste characteristics, they will be handled in accordance with the criteria in Chapter 4.

- f.* General POL pipeline provisions for testing and maintenance. All pipeline facilities carrying POL must be tested and maintained IAW recognized U.S. industry standards. This includes, but is not limited to the following requirements:
 - (1) Commanders of activities responsible for operation of pipeline facilities handling POL will prepare and follow a procedural manual for operations, maintenance and emergencies.
 - (2) Each new pipeline system and each system in which pipe has been replaced or relocated must be hydrostatically tested, IAW recognized U.S. industry standards, without leakage.
- g.* General POL pipeline construction. All new tank and pipeline facilities with a construction start date after 1 October 1994 will be designed and constructed to meet recognized U.S. industry standards.
- h.* The POL spills and leaks. To control accidental POL releases, the installation must follow the guidance in the spill plan required under subparagraph 18-3.g in Chapter 18.
- i.* Bulk petroleum management. USFK Regulation 703-1 establishes petroleum policy, assigns responsibilities, and prescribes procedures for the management of bulk petroleum. All USFK activities will comply with this regulation as a minimum.

Chapter 10 NOISE

10-1. SCOPE.

This section contains criteria to control environmental noise within installations. It is limited to measures allowing reasonable internal USFK planning efforts and does not address procedures for operating aircraft or ships, which are outside the scope of DODI 4715.5.

10-2. DEFINITIONS.

- a. **A-weighted sound level.** Calculation of noise exposure that emphasizes sound in the frequency range where most speech information occurs, and thus closely resembles the frequency response of the human ear. Sound measures that are measured on the A-scale are abbreviated dB(A).
- b. **Day-night average sound level (Ldn).** A measure of installation noise exposure expressed in a single number ("xx Ldn" as in 55 Ldn) that is obtained by adding a 10dB penalty to nighttime sound levels (2200-0700) to account for increased annoyance caused by noise during these hours.
- c. **Decibel (dB).** The unit of sound pressure is the decibel and is symbolically represented as dB. Sound pressure is the amplitude or measure of the difference between atmospheric pressure (with no sound present) and total pressure (with sound present). The decibel scale is a logarithmic scale. The standard reference pressure for 0dB is 0.00002 Pascals.
- d. **Equivalent level (LEQ).** Is the equivalent steady-state sound that, in a stated period of time, would contain the same acoustic energy as the time-varying sound during the same period.
- e. **Facilities controlling noise/vibration.** Those facilities that remove or reduce noise and/or vibration from facilities generating noise/vibration (defined in table 10-8).
- f. **Facilities generating noise/vibration.** Those machines, instruments, facilities, and the others that generate noise and vibration (defined in table 10-7).
- g. **Improvement order.** An order that may be issued by the MOE when noise and/or vibration limits of facilities generating noise and/or vibrations violate the permissible noise/vibration standards prescribed in the Korean Noise/Vibration Control Law. This order may direct the respective businessman to establish, improve, replace or take any other necessary measures on the generation facilities or the prevention facilities within a period prescribed by the Prime Minister Order.
- h. **Noise.** Unwanted or annoying sound caused by the use of machines, instruments, facilities, and others.
- i. **Noise/vibration control zone.** An area designated by the Mayor/Governor deemed necessary to prevent noise/or vibration from special construction works in order to preserve the living environment of the residents of that area.
- j. **Sound exposure level (SEL).** The SEL is a measure of single noise events, such as ground run-up or blast noise. It is the level, in decibels, of the time integral of squared A-weighted sound pressure over a given time period or event, with reference to the square of the standard reference sound pressure of 20 micropascals and a reference duration of 1 second.
- k. **Transportation.** Refers to trains, automobiles, streetcars, roadways, and railroads. However, airplanes and ships are excluded.

10-3. CRITERIA.

- a. Installations with significant noise sources will develop and maintain a noise contour map limited to the installations.
- b. Installations may use a computerized program for developing noise contours from operational data using the day-night average sound level (Ldn) noise descriptor system.
- c. Noise analysis for airfields will be developed using the A-weighted day-night average sound level (Ldn).
- d. Installations will maintain records of incompatible buildings and land uses on the installation. Compatible uses are set out in table 10-1.
- e. Installations will review installation master plans to ensure that existing and future facility citing is consistent with an acceptable noise environment.
- f. The citing and conduct of ground run-up will be evaluated for low frequency vibration as well as general audible noise.
- g. Installations will identify noise sources that create noise impacts, investigate possible mitigation measures, and program resources to reduce noise impacts if practical.
- h. Installations are required to maintain operational data to facilitate development of noise level contour installation compatible use zone studies.
- i. Installations will have procedures to register and resolve noise complaints in accordance with paragraph 1-13 of these EGS.
- j. General noise standards. The general limitation of noise and vibration levels are established in table 10-2. Exceeding these levels requires self-monitoring by those generating noise and vibration.
- k. Restriction standards for living noise. Installations that emit noise discharges in the noise restriction areas shall comply with the standards for living noise, referenced in table 10-3.
- l. Permissible noise/vibration standards for facilities generating noise/vibration.
 - (1) When a facility generating noise/vibration is being built or modified, a facility controlling noise/vibration must also be built, which is designed and executed by a registered individual or company unless the noise/vibration generation is below the permissible standards.
 - (2) The following standards are applied to the noise/vibration from a factory, however, in a case where any facility generating noise/vibration is installed, installation of facilities controlling noise/vibration is recommended.
 - (3) The facilities are exempted from these requirements, if no residential buildings, shopping malls, schools, hospitals, religious buildings, factories, or tourism sites are found within 200m from the border of the facilities generating noise/vibration.
 - (4) Noise. The correction factors in table 10-4 may be applied to the measured noise level before comparing with noise standards. The total correction factors in table 10-4 shall be 50 dB(A) or less.
 - (5) Vibration. The correction factors in table 10-5 may be applied to the measured vibration level before comparing with vibration standards. The total correction factors in table 10-5 shall be 60 dB(A) or less.
- m. Motor vehicle noise standards. These criteria apply to USFK-owned, non-tactical vehicles and privately owned vehicles. Owner or responsible person will observe the following noise standards for running automobiles referenced in table 10-6.
- n. Checking items and methods for self-monitoring records. Anyone who operates a facility generating noise/vibration referenced in table 10-7 shall measure the noise and/or vibration annually and the results shall be recorded and maintained for four (4) years. The self-monitoring process may be exempted for the facility having a facility controlling noise/vibration.

NOTES: The following computer programs are available for noise control planning:

1. The noise simulation program used to assess heavy weapons noise is MicroBNOISE. This software was developed and is maintained by the U.S. Army Construction Engineering Research Laboratories, Champaign, IL.

2. Noise level contours for airfields are generated using the NOISEMAP 6.1 computer program. This program is maintained by the U.S. Air Force Armstrong Laboratory, Wright-Patterson AFB, OH.

TABLE 10-1 ACCEPTABLE LAND USES AND MINIMUM BUILDING SOUND LEVEL REQUIREMENTS					
Facility (Land Use)	Outdoor Noise Environment (Ldn/Leq in dB)				
	85-89	80-84	75-79	70-74	65-69
Family Housing	No	No	No	NLR30(4)	NLR25(4)
Bachelor Housing	No	No	NLR35(4)	NLR30(4)	NLR25(4)
Transient Lodging - Hotel, Motel, etc.	No	No	NLR35(4)	NLR30(4)	NLR25(4)
*Classrooms, Libraries, Churches	No	No	No	NLR30	NLR25
*Offices and Administration Buildings - Military	NLR40	NLR35	NLR30	NLR25	Yes
*Offices - Business and Professional	No	No	NLR30	NLR25	Yes
Hospitals, Medical Facilities, Nursing Homes (24-hr. occupancy)	No	No	No	NLR30	NLR25
*Dental Clinic, Medical Dispensaries	No	No	NLR30	NLR25	Yes
*Outdoor Music Shells	No	No	No	No	No
*Commercial and Retail Stores, Exchanges, Movie Theaters, Restaurants and Cafeterias, Banks, Credit Unions, EM/Officer Clubs	No	No	NLR30	NLR25	Yes
*Flightline Operations, Maintenance and Training	NLR35(5)	NLR30(5)	Yes	Yes	Yes
*Industrial, Manufacturing and Laboratories	No	NLR35(5)	NLR30(5)	NLR25(5)	Yes
*Outdoor Sports Arenas, Outdoor Spectator Sports	No	No	No	Yes(1)	Yes(1)
*Playgrounds, Active Sport Recreational Areas	No	No	No	Yes	Yes
*Neighborhood Parks	No	No	No	Yes	Yes

TABLE 10-1 (Cont)
ACCEPTABLE LAND USES AND MINIMUM BUILDING SOUND LEVEL REQUIREMENTS

Facility (Land Use)	Outdoor Noise Environment (Ldn/Leq in dB)				
	85-89	80-84	75-79	70-74	65-69
*Gymnasiums, Indoor Pools	No	NLR30	NLR25	Yes	Yes
*Outdoor - Frequent Speech Communication	No(2,3)	No(2,3)	No(2)	No(2)	No(2)
*Outdoor - Infrequent Speech Communication	No(2,3)	No(2,3)	Yes	Yes	Yes
Livestock Farming, Animal Breeding	No	No	No	Yes	Yes
*Agricultural (except livestock)	Yes(3)	Yes(3)	Yes	Yes	Yes

NOTES:

* For detailed designs, the Leq for the appropriate periods of usage is the preferred measure of the noise environment.

Yes - Land use compatible with noise environment. No special noise control restriction. Normal construction appropriate.

NLR - Appropriate noise level reduction where indoor activities predominate.

No - Land use not compatible with noise environment, even if special building noise insulation provided.

1. Land use is acceptable provided special sound reinforcement systems are installed.
2. Land use may be acceptable provided special speech communication systems are used.
3. Land use may be acceptable provided hearing protection devices are worn by personnel. Check applicable hearing damage regulations.
4. Although it is recognized that local conditions may require residential uses in these areas, this use is strongly discouraged in Ldn 70-74 and Ldn 75-79 and discouraged in Ldn 65-69. The absence of viable alternative development options should be determined. The NLR criteria will not eliminate outdoor environment noise problems and, as a result, site planning and design should include measures to minimize this impact particularly where the noise is from ground level sources.
5. The LDR must only be incorporated into the design and construction of portions of these buildings where the public is received, office areas, and noise sensitive work areas or where the normal noise level is low.

TABLE 10-2 GENERAL NOISE STANDARDS		
General Areas	Standards (LEQ dB(A))	
	Daytime (06:00 - 22:00)	Night (22:00 - 06:00)
Area		
I	50	40
II	55	45
III	65	55
IV	70	65
Road Side		
I, II	65	55
III	70	60
IV	75	70

* Not applicable to noise from trains and construction activities.

NOTES:

Category I includes--

1. Natural environmental preservation areas, tour/recreation areas, and settlement areas, prescribed in the Land Use and Management Law.
2. Green belts prescribed in the Urban Planning Law.
3. Exclusive residential areas prescribed in the Presidential Decree for the Urban Planning Law.
4. Areas within 50m from the boundary of the hospital prescribed in the Medical Law.
5. Areas within 50m from the boundary of schools.

Category II includes--

1. All settlement areas other than residential sectors prescribed in the Land Use and Management Law.
2. General and semi-residential areas prescribed in the Presidential Decree for the Urban Planning Law.

Category III includes--

1. Commercial areas prescribed in the Urban Planning Law.
2. Semi-industrial areas prescribed in the Presidential Decree for the Urban Planning Law.

Category IV includes--

1. General and exclusive industrial areas prescribed in the Presidential Decree for the Urban Planning Law.
2. Industrial areas prescribed in the Land Use and Management Law.

TABLE 10-3 STANDARDS FOR NOISE NEAR LIVING AREAS UNIT: DB(A)					
Area	Type of Noise		Morning (05:00 - 08:00) Evening (18:00 - 22:00)	Day time (08:00 - 18:00)	Night time (22:00 - 05:00)
Residential, greenbelt, resort, natural environmental preservation area, area inside of 50m radius from boundary of school and hospital.	noise from megaphone or loudspeaker	outdoor provision	70 or less	80 or less	60 or less
		indoor provision	50 or less	55 or less	45 or less
	factory and business		50 or less	55 or less	45 or less
	noise from construction site		65 or less	70 or less	55 or less
Commercial, industrial, areas other than residential in colony.	noise from megaphone or loudspeaker	outdoor provision	70 or less	80 or less	60 or less
		indoor provision	60 or less	65 or less	55 or less
	noise from construction site		70 or less	75 or less	55 or less

NOTES:

1. Area classification is based on the Land Use and Management Law; Urban area classifications are based upon the Urban Planning Law.
2. If noise from construction sites is generated less than 2 hours/day during daytime, the restriction noise standard permits an additional 10 dB; if between 2 - 4 hours/day, an extra 5 dB is permitted.
3. Civil defense drill alarms (over outdoor loudspeakers) shall sound for no more than two (2) minutes each month.

TABLE 10-4 CORRECTION FACTORS FOR PERMISSIBLE NOISE STANDARDS FOR FACILITIES GENERATING NOISE		
Category	Description	Correction Factor
Blast	Sudden outburst of sound	+5
Percentage of noise duration to the period concerned ¹ .	50% or more	0
	25% or more, and less than 50%	-5
	12.5% or more, and less than 25%	-10
	Less than 12.5%	-15
By hour.	Daytime: 0600 – 1800	0
	Evening: 1800 - 2400	+5
	Night time: 2400 - 0600	+10
By area ² .	Urban area exclusive residential area, green area general residential area, semi-residential area commercial area, semi-industrial area general industrial area, exclusive industrial area	0 -5 -15 -20
	Forest preservation area, Natural environment preservation area, Tour/recreation area, residential sector in the village area	+20
	Whole sector in the village area except residential sector, Aquatic resources preservation area, Cultivation area, Development promotion area, Reserved area, Unspecified area	+20
	Industrial area	-20
	Area within 50m from the border of general hospitals defined by the Medical Law and schools defined by the Education Law	0

NOTES:

1. Periods: 8 hours during daytime; 4 hours in the evening; 2 hours at night.
2. Area classification is based on the Land Use and Management Law; Urban area classifications are based upon the Urban Planning Law.

TABLE 10-5 CORRECTION FACTORS FOR PERMISSIBLE VIBRATION STANDARDS FOR FACILITIES GENERATING VIBRATIONS		
Category	Description	Correction Factor
Percentage of vibration duration to the period concerned ¹ .	50% or more	0
	25% or more, and less than 50%	-5
	Less than 25%	-10
By hour.	Daytime: 0600 - 1800	0
	Evening: 1800 - 2400	+5
	Night time: 2400 - 0600	+5
By area ² .	Urban area exclusive residential area, green area general residential area, semi-residential area commercial area, semi-industrial area general industrial area, exclusive industrial area	0 -5 -10 -15
	Forest preservation area, Natural environment preservation area, Tour/recreation area, residential sector in the village area	0
	Whole sector in the village area except residential sector, Aquatic resources preservation area, Cultivation area, Development promotion area, Reserved area, Unspecified area	-5
	Industrial area	-15
	Area within 50m from the border of general hospitals defined by the Medical Law and schools defined by the Education Law	0

NOTES:

1. Periods: 8 hours in daytime; 4 hours in the evening; 2 hours at night.
2. Area classification is based on the Land Use and Management Law; Urban area classifications are based upon the Urban Planning Law.

TABLE 10-6 NOISE STANDARDS FOR OPERATING VEHICLES			
Type of Noise Type of Vehicle	Muffler Noise (dB(A))		Horn Noise (dB(C))
	Feb 2, 1991 - Dec 31, 1995	after Jan 1, 1996	after Feb 2, 1991
Light Duty Automobile	103 or less	100 or less	115 or less
Passenger Automobile	103 or less	100 or less	
Small Freight Vehicles	103 or less	100 or less	
Heavy Duty Vehicles	107 or less	105 or less	
Two-Wheel Vehicles	110 or less	105 or less	

NOTES:

Types of Vehicles:

1. Light Duty Automobiles:
 - ? automobiles for a very small number of passengers or small amount of freight
 - ? engine size (emission): less than 800cc
2. Passenger Automobiles:
 - ? ordinary passenger vehicles, including wagons
 - ? engine size (emission): 800cc or larger
 - ? weight: less than 3 tons
3. Small Freight Vehicles:
 - ? ordinary freight vehicles, including jeeps, coaches, and vans.
 - ? engine size (emission): 800cc or larger
 - ? weight: less than 3 tons
4. Heavy Duty Vehicles:
 - ? vehicles for a very large number of passengers or large amount of freight
 - ? weight: 3 tons or larger
5. Two Wheel Vehicles:
 - ? vehicles, including motorcycles and passenger side cars, for one or two passengers.
 - ? engine size (emission): 50cc or larger
 - ? weight: less than 0.5 ton

TABLE 10-7
FACILITIES GENERATING NOISE/VIBRATIONS

1. Facilities generating noise.

a. Structure, machine, and equipment using motive power (by horse power [hp])--

- ? compressor with 10 hp or more.
- ? ventilator with 10 hp or more.
- ? cutter with 10 hp or more.
- ? pressure with 10 hp or more.
- ? crusher with 10 hp or more.
- ? transmitter with 30 hp or more.
- ? lathe with 20 hp or more.
- ? flour maker with 20 hp or more.
- ? saw (at lumber mill) with 20 hp or more.
- ? wood processing facility with 20 hp or more.
- ? printing facility with 20 hp or more.
- ? roller with 30 hp or more.
- ? any facility that has a structure, machine, or equipment listed above will be considered a discharge facility (facility that emits or generates noise) if their total horse power in the same category exceeds 50 hp, even if individual horse power does not reach the criteria listed above.
- ? any facility that has a structure, machine, or equipment listed above will be considered a discharge facility if their total horse power in the same category exceeds the criteria listed above.

b. Structures, machines, and equipment using motive power (by number)-

- ? 100 or more industrial sewing machines.
- ? cement brick or cement block manufacturing facility with 4 pressers or vibrators.

2. Facilities generating vibration.

- ? press with 20 hp or more (oil-pressure driven is excluded).
- ? crusher with 30 hp or more.
- ? wood processing facility with 30 hp or more.
- ? casting instrument with 50 hp or more.
- ? cement brick or cement block manufacturing facility with 4 pressers or vibrators.

NOTE: To convert from kW to hp, multiply by 1.34.

TABLE 10-8
NOISE AND VIBRATION CONTROL BARRIERS AND EQUIPMENT

1. Noise reduction control.
 - a. Soundproofing silencers.
 - b. Soundproofing covers and roofs.
 - c. Engineered windows and walls.
 - d. Soundproofing tunnels.
 - e. Trees, forests and hills.
 - f. Noise absorbing equipment and facilities.
 - g. Other noise controls equivalent to or better than those listed above.
2. Vibration proofing barriers.
 - a. Elastic supports and vibration suppressers.
 - b. Vibration prevention furrows.
 - c. Vibration control piping.
 - d. Other controls which are equivalent to or better than those above.

Chapter 11 PESTICIDES

11-1. SCOPE.

This chapter contains criteria regulating the use, storage and handling of pesticides, herbicides, and defoliants at USFK installations, but does not address the use of these materials by individuals acting in an unofficial capacity in a residence or garden. For the purposes of this document, pesticides generically refer to chemicals killing pests, which include fungicides, insecticides, rodenticides, herbicides and defoliants. The disposal of pesticides is covered in Chapters 6 and 7.

11-2. DEFINITIONS.

- a. **Certified Pesticide Applicators.** Personnel who apply pesticides or supervise the use of pesticides, and who have been formally certified in accordance with the Department of Defense Manual, DoD Pest Management Training and Certification (DoD 4150.7-M) (which accepts ROK certification in appropriate circumstances).
- b. **Integrated Pest Management (IPM).** A planned program, incorporating continuous monitoring, education, record-keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, materiel, or the environment. IPM uses targeted, sustainable (effective, economical, environmentally sound) methods including education, habitat modification, biological control, genetic control, cultural control, mechanical control, physical control, regulatory control, and where necessary, the judicious use of least-hazardous pesticides.
- c. **Pests.** Arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds, undesirable vegetation, and other organisms (except for microorganisms that cause human or animal disease) that adversely affect the well being of humans or animals, attack real property, supplies, equipment or vegetation, or are otherwise undesirable.
- d. **Pest Management Consultant (PMC).** Professional DoD pest management personnel located at component headquarters, field operating agencies, major commands, facilities engineering field divisions or activities, or area support activities who provide technical and management guidance for the conduct of installation pest management operations. Some pest management consultants may be designated by their component as certifying officials.
- e. **Pesticide.** Any substance or mixture of substances, including biological control agents, that may prevent, destroy, repel, or mitigate pests.
- f. **Pesticide Waste.** Materials subject to pesticide disposal restrictions including:
 - (1) Any pesticide that has been identified by the pest management consultant as cancelled under U.S. or ROK authority;
 - (2) Any pesticide that: does not meet specifications, is contaminated, has been improperly mixed, or is otherwise unusable, whether concentrated or diluted;
 - (3) Any material used to clean up a pesticide spill; or
 - (4) Any containers, equipment, or material contaminated with pesticides. Empty pesticide containers that have been triple rinsed are not considered hazardous waste, and can be disposed of as normal solid waste.
- g. **Registered Pesticide.** A pesticide that has been registered and approved for sale or use within the United States or Korea.

11-3. CRITERIA.

- a. All pesticide applications, excluding arthropod skin and clothing repellents, will be recorded using DD Form 1532-1, "Pest Management Maintenance Report," or a computer-generated equivalent. These records will be archived for permanent retention in accordance with specific service procedures. The Pest Management Maintenance Report has been assigned Report Control Symbol DD-A&T (A&AR) 1080 in accordance with DoD 8910-M, "DoD Procedures for Management of Information Requirements". Individual services shall establish the required level of record keeping and reporting via their PMCs. The appropriate records will be forwarded, using DD 1532, "Pest Management Report" to higher command and medical authorities for review, including a copy to USFK Engineer.
- b. Installations will implement and maintain a current (annually updated) pest management plan that includes pest management/control measures based upon appropriate surveillance data for all installation and satellite site activities. The plan will be written in English and Korean translation will be provided to Pest Control shop Korean supervisors and workers. This written plan will include IPM procedures for preventing pest problems in order to minimize the use of pesticides. The plan must be reviewed and approved in writing by the appropriate pest management consultant.
- c. All pesticide applications will be made by certified pesticide applicators, with the following exceptions:
 - (1) New USFK employees who are not certified may apply pesticides during an apprenticeship period not to exceed 2 years and only under the supervision of a certified pesticide applicator;
 - (2) Arthropod repellents applying to skin and aerosol type repellents for clothing; and
 - (3) Pesticides applied as part of an installation's self help program.
- d. All pesticide applicators will be included in a medical surveillance program to monitor the health and safety of persons occupationally exposed to pesticides.
- e. All pesticide applicators will be provided with personal protective equipment appropriate for the work they perform and the types of pesticides to which they may be exposed.
- f. Installations will only use registered pesticides on the latest approved list distributed by the USFK Engineer. USFK Engineer will update the list as required after coordination with the appropriate pest management consultant and other technical experts. This may be documented as part of the approval of the pest management plan.
- g. Pesticides will be included in the installation spill contingency plan (See Chapter 18).
- h. Pest management facilities, including mixing and storage areas, will comply with Military Handbook 1028-8A.
- i. Labels will bear the appropriate use instructions and precautionary message based on the toxicity category of the pesticide ("danger," "warning" or "caution"). If Korean nationals will be using the pesticides, the precautionary messages and use instructions will be in English and Korean.
- j. Material Safety Data Sheets (MSDSs) and labels for all pesticides will be available at the storage and holding facility and on each pesticide vehicle.
- k. Pesticide storage areas will contain a readily visible current inventory of all items in storage, including items awaiting disposal, and shall be inspected monthly and shall be secured to prevent unauthorized access.
- l. Unless otherwise restricted or canceled, pesticides in excess of installation needs will be redistributed within the supply system or disposed of in accordance with procedures outlined below.
- m. The generator of pesticide wastes will determine if waste is considered hazardous or not in accordance with Chapter 6 of this pamphlet.

- (1) Pesticide waste determined to be hazardous waste will be disposed of in accordance with the criteria for hazardous waste disposal in Chapter 6.
- (2) Pesticide waste that is determined not to be a hazardous waste will be disposed of in accordance with the label instructions, through DRMO, as a solid waste. Pesticide containers shall be crushed or the top and bottom portions shall be removed to prevent reuse.

Chapter 12

HISTORIC AND CULTURAL RESOURCES

12-1. SCOPE.

This chapter contains criteria for required plans and programs needed to ensure proper protection and management of cultural resources, including historic and prehistoric properties under USFK control, and properties on the World Heritage List or on the ROK's list equivalent to the U.S. National Register of Historic Places. The purpose is to preserve and protect buildings, structures, sites, and objects of historical, architectural, archaeological, or cultural value on USFK-controlled property and in maneuver rights area. Specifically, this chapter advises on the issues of orders for restriction or prohibition of certain action and for the establishment, elimination or removal of facilities for environmental conservation of specified cultural properties, and excavation of buried cultural properties, etc.

12-2. DEFINITIONS.

- a. **Action.** All activities or programs of any kind authorized, funded, or carried out, in whole or in part, on USFK-controlled installations.
- b. **Adverse effect.** Changes that diminish the quality or significant value of historic or cultural resources.
- c. **Archeological resource.** Any material remains of prehistoric or historic human life or activities. Such resources include, but are not limited to pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion of any of the foregoing items.
- d. **Buried cultural property.** A cultural property that was buried or discovered under the land, on the sea-bottom or at a construction site.
- e. **Cultural mitigation.** Specific steps designed to lessen the adverse effects of a USFK action on a cultural or archeological resource, including.
 - (1) Limiting the magnitude of the action.
 - (2) Relocating the action in whole or in part.
 - (3) Repairing, rehabilitating, or restoring the effected property.
 - (4) Recovering and recording data from cultural properties that may be destroyed or substantially altered.
- f. **Cultural properties.** This refers to the following list:
 - (1) Tangible cultural properties: Buildings, classical books, calligraphic ancient documents, painting, sculptures, industrial art objects, etc., and other tangible cultural products which possess high historic or artistic value and other archeological specimens which belong to categories above.
 - (2) Monuments. Shell-mound, ancient tombs, castle sites, palace sites, pottery remains, layers containing remains, etc. and other sites of historical remains which possess high historical or scientific value, scenic beauties which possess high artistic or ornamental values and animals (including the places of habitat, breeding, and migration), plants (including habitat), minerals and caves which have high scientific value.
- g. **Designated cultural properties.** This refers to the following:
 - (1) National designated cultural properties. Cultural properties that are designated by the Minister of Culture & Athletics.
 - (2) City/Province designated cultural properties. Cultural properties which are not National Designated Cultural Properties but are deemed worthy of preservation

which are designated by the various Mayors and Governors within their respective property jurisdictions.

- h.* **Historic and cultural resources program.** Identification, evaluation, documentation, curation, acquisition, protection, rehabilitation, restoration, management, stabilization, maintenance, recording, and reconstruction of historic and cultural resources and any combination of the foregoing.
- i.* **Historic or cultural resource** - physical remains of any prehistoric or historic district, site, building, structure, or object significant in world, national or local history, architecture, archeology, engineering, or culture. The term includes artifacts, archeological resources, records, and material remains that are related to such a district, site, building, structure, or object. The term also includes any property listed on the World Heritage List or the ROK's equivalent of the National Register of Historic Places.
- j.* **Inventory.** To determine the location of cultural resources that may have world, national or local significance.
- k.* **Material remains.** Physical evidence of human habitation, occupation, use, or activity, including the site, loci, or context in which such evidence is situated including:
 - (1) Surface or subsurface structures;
 - (2) Surface or subsurface artifact concentrations or scatters;
 - (3) Whole or fragmentary tools, implements, containers, weapons, clothing, and ornaments;
 - (4) By-products, waste products, or debris resulting from manufacture or use;
 - (5) Organic waste;
 - (6) Human remains;
 - (7) Rock carvings, rock paintings, and intaglios;
 - (8) Rock shelters and caves;
 - (9) All portions of shipwrecks; or
 - (10) Any portion or piece of any of the foregoing.”)
- l.* **National treasure.** Tangible cultural properties chosen from among the “Treasures”, by the Minister of Culture & Athletics after consultation with the Cultural Properties Committee. National treasures are rare and of great human cultural value.
- m.* **Preservation.** The act or process of applying measures to sustain the existing form, integrity, and material of a building or structure, and the existing form and vegetative cover of a site. It may include initial stabilization work where necessary, as well as ongoing maintenance of the historic building materials.
- n.* **Protection.** The act or process of applying measures designed to affect the physical condition of a property by safeguarding it from deterioration, loss, attack or alteration, or to cover or shield the property from danger or injury. In the case of buildings and structures, such treatment is generally temporary and anticipates future historic preservation treatment; in the case of archaeological sites, the protective measure may be temporary or permanent.
- o.* **Treasure.** Especially important tangible cultural properties designated by the Minister of Culture & Athletics after consultation with the Cultural Properties Committee.

12-3. CRITERIA.

- a.* Installation commanders shall take into account the effect of any action on any property listed on the World Heritage List or on the ROK's equivalent of the National Register of Historic Places for purposes of avoiding or mitigating any adverse effects.
- b.* Installations shall have access to the World Heritage List and the ROK's equivalent of the National Register of Historic Places.

- c. Installation commanders shall ensure that personnel performing historic or cultural resource functions have the requisite expertise in world, national and local history and culture. This may be in-house, contract, or through consultation with another agency. Government personnel directing such functions must have training in historic or cultural resource management.
- d. Installations shall, after coordination with the ROK installation commander or similar appropriate ROK authorities, and if financially and otherwise practical:
 - (1) Inventory historic and cultural resources in areas under USFK control. An inventory shall be developed from a records search and visual survey.
 - (2) Develop a plan for the protection and preservation of historic and cultural resources identified on the installation inventory and for mitigation of any adverse effects.
 - (3) Establish measures sufficient to protect known historic or cultural resources until appropriate mitigation or preservation can be completed.
 - (4) Establish measures sufficient to protect known archeological resources until appropriate mitigation or preservation can be completed.
- e. Installations will establish measures to prevent excavation of cultural properties. Areas known to contain buried or submerged historic properties shall not be excavated or disturbed.
- f. If financially and otherwise practical, installations will inventory archeological resources in areas under USFK control.
- g. Installations will establish measures sufficient to protect known archeological resources until appropriate mitigation or preservation can be completed.
- h. Installations will establish measures to prevent USFK personnel from disturbing or removing archeological resources without permission of the ROK. No one shall export or carry a cultural property, such as a national treasure, treasure, or important folk-lore material, out of the country except with the written permission of the ROK government. Specifically, anyone who holds an advanced permit from the Ministry of Culture and Tourism for the purpose of international cultural exchange may be exempted from the above requirement.
- i. Installation commanders shall ensure that planning for major actions includes consideration of possible effects on historic or cultural resources.
- j. If potential historic or cultural resources not previously inventoried are discovered in the course of a USFK action, the newly-discovered items will be preserved and protected pending a decision on final disposition by the installation commander. The decision on final disposition will be made by the installation commander after coordination with USFK ACofS Engineer.
- k. Installation Commanders shall report the discovery of any potential cultural property or resources, or archeological resources not previously inventoried that are discovered in the course of a USFK action to the USFK ACofS, Engineer. In turn, the USFK ACofS, Engineer shall notify ROK officials through the proper channels.

Chapter 13

ENDANGERED SPECIES AND NATURAL RESOURCES

13-1. SCOPE.

This chapter establishes criteria for required plans and programs needed to ensure proper protection, enhancement and management of natural resources and any species (flora and fauna) declared endangered or threatened by either United States or Korean government. The Korean government designates protection areas where the preservation of natural ecosystems is specially needed and imposes restrictions on collecting, or importing and exporting endangered or specified wild animals or plants.

13-2. DEFINITIONS.

- a. **Action.** All activities or programs of any kind authorized, funded, or carried out, in whole or in part, by USFK installations.
- b. **Adverse effect.** Changes that diminish the quality or significant value of natural resources. For biological resources, adverse effects include overall population diversity, abundance and fitness.
- c. **Conservation.** Planned management, use and protection; continued benefit for present and future generations; and prevention of exploitation, destruction and/or neglect of natural resources.
- d. **Endangered or threatened species.** Any species of flora or fauna, listed in Tables 13-1.
- e. **ROK protected species.** Any species of flora or fauna listed in Table 13-2, because the species continued existence is, or is likely to be, threatened and is therefore subject to special protection from destruction or adverse modification of associated habitat.
- f. **Management plan.** A document describing natural resources, their quantity, condition, and actions to ensure conservation and good stewardship.
- g. **Natural ecosystem preservation area.** Refers to areas, listed in Table 13-3 of this section, which fall under one of following areas designated.
 - (1) An area that is worthy of scientific research since it keeps the originality of natural ecosystems or has abundant natural resources.
 - (2) An area that requires preservation for scientific research or natural scenery since its topographic or geological features are unique.
 - (3) An area that is worthy of preservation, where endangered species or Korean native species grow.
 - (4) An area that represents diverse ecosystems or a sample of ecosystem.
 - (5) An area that requires special protection of other natural ecosystems.
- h. **Natural resource.** All living and inanimate materials supplied by nature that are of aesthetic, ecological, educational, historical, recreational, scientific or other value.
- i. **Natural resources management.** Action taken to protect, manipulate, alter, or natural resources in harmony to meet present and future human needs.
- j. **Significant land or water areas.** A land or water area outside the cantonment that is normally at least 500 acres in size; smaller areas may be included if they have natural resources that are especially sensitive.

13-3. CRITERIA.

- a. Installations that have land and water areas shall take reasonable steps to protect and enhance known endangered or threatened species and ROK protected species and their habitat.

- b.* Installation will maintain, or have access to, Table 13-1 and a current list of the ROK protected species, listed in Table 13-2.
- c.* Installations with significant land or water areas shall, after coordination with the ROK installation commander or similar appropriate ROK authorities, develop natural resources management plans.
- d.* Installation Commanders shall report the discovery of any endangered species to the USFK ACoS, Engineer. In turn, the ACoS, Engineer shall notify ROK officials through the SOFA Environmental Subcommittee.
- e.* Installations having natural resources management plans shall, after coordination with the host nation installation commander or similar appropriate host nation authorities, and if financially and otherwise practical, and in such a way that there is no net loss of mission capability:
 - (1) Initiate surveys for endangered or threatened species and host nation protected species identification, or support host nation-initiated surveys.
 - (2) Implement natural resources management plans")
- f.* Installations shall maintain grounds to meet designated mission use and ensure harmony with the natural landscape and/or the adjacent ROK facilities where practical.
- g.* Installations shall ensure that personnel performing natural resource functions have the requisite expertise in the management of their discipline (i.e., endangered or threatened species, ROK protected species, wetlands, soil stabilization). This may be in-house, contract, or through consultation with another agency. Government personnel directing such functions must have training in natural resources management.
- h.* Installations shall place emphasis on the maintenance and protection of habitats favorable to the reproduction and survival of indigenous plants, fish and wildlife.
- i.* Land and vegetative management activities will be consistent with current conservation and land use principles (e.g. ecosystem protection, biodiversity conservation and mission-integrated land use).
- j.* Installations shall utilize protective vegetative cover or other standard soil erosion/sediment control practices to control dust, stabilize sites and avoid silting of streams.
- k.* No one is permitted to capture, collect, transplant, export, process, distribute, or store specified wild species, except specially permitted cases.
- l.* Anyone who intends to export, import, or transport any species other than dogs and cats shall have an approval from the ROK MOE.

Table 13-1
Endangered/threatened species

Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Mammals	1	Myotis formosus chofukusei Mori	Bul-gun-bak-jui	Korean orange whiskered bat, golden-winged myotis, or jobokseong bat
	2	Canis lupus coreanus Abe	Nuk-dae	Asiatic or Chinese Wolf
	3	Vulpes vulpus peculiosa Kishida	Yeo-woo	Korean Red Fox
	4	Panthera pardus orientalis Schlegel	Pyo-bum	Siberian Long-haired Tiger
	5	Panthera tigris altaica Temminck	Ho-rang-l	Korean Leopard Amur
	6	Lutra lutra (Linnaeus)	Su-dal	Eurasian river otter
	7	Zalophus californianus japonica Peters	Ba-da-sa-ja	Japanese Sea Lion
	8	Ursus thibetanus ussuricus Heude	Ban-dal-sa-sum-gom	Marchurian Black Bear
	9	Moschus moschiferus parvipes Hollister	Sa-hyang-no-ru	Korean Musk-Deer
	10	Naemorhedus caudatus (Milne-Edwards)	San-yang	Chinese or Long-Tailed Goral
Birds	1	Egretta eulophotes (Swinhoe)	No-rang-bu-ri-baek-ro	Chinese Egret
	2	Ciconia boyciana Swinhoe	Hwang-sae	Oriental White Stork
	3	Platalea leucorodia Linnaeus	No-rang-bu-ri-jeo-o-sae	Spoonbill
	4	Platalea minor Temminck & Schlegel	Jeo-o-sae	Black-faced Spoonbill
	5	Cygnus olor (Gmelin)	Heuk-go-ni	Mute Swan
	6	Haliaeetus albicilla (Linnaeus)	Hin-kko-ri-su-ri	White-tailed Sea Eagle
	7	Haliaeetus pelagicus (Pallas)	Cham-su-ri	Steller's Sea Eagle
	8	Aquila chrysaetos Linnaeus	Kum-dok-su-ri	Golden Eagle
	9	Falco peregrinus Tunstall	Mae	Peregrine Falcon
	10	Grus japonensis (P.L.S. Müller)	Du-ru-mi	Manchurian (or Japanese) Crane
	11	Eurynorhynchus pygmeus (Linnaeus)	Nub-juk-bu-ri-do-yo	Spoon-billed Sandpiper
	12	Tringa guttifer (Nordmann)	Chung-da-ri-do-yo-sa-chon	Nordmann's Sandpiper
	13	Dryocopus javensis (Horsfield)	Keu-nak-sae	Tristram's Woodpecker

* NOTE: Endangered/threatened species are defined by the scientific name. English names are provided for general understanding.

Table 13-1 (Cont) Endangered/threatened species				
Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Amphibians/ Reptiles	1	<i>Elaphe schrenckii</i> (Strauch)	Ku-rung-l	Russian Rat Snake
Fish	1	<i>Pseudopungtungia nigra</i> Mori	Kam-dol-go-gi	
	2	<i>Gobiobotia naktongensis</i> Mori	Hin-su-ma-ja	
	3	<i>Iksookimia choii</i> (Kim et Son)	mi-ho-jong-gae	
	4	<i>Pseudobagrus brevicorpus</i> (Mori)	Kko-chi-dong-ja-gae	
	5	<i>Liobagrus obesus</i> Son, Kim et Choi	Tung-sa-ri	
Insects	1	<i>Callipogon relictus</i> Semenov-Tian-Shansky	Jang-su-ha-nul-so	
	2	<i>Metopodontus blanchardi</i> Parry	Du-jum-bak-i-sa-sum-bul-lae	
	3	<i>Polyphylla laticollis manchuricus</i> Semenov	Su-yeom-pung-deng-l	
	4	<i>Aporia crataegi</i> (Linnaeus)	Sang-je-na-bi	
	5	<i>Eumenis autonoe</i> (Esper)	San-gul-dduk-na-bi	
Invertebrate animals	1	<i>Charonia sauliae</i> (Reeve)	Na-pal-go-dung	Saul's Triton
	2	<i>Cristaria plicata</i> (Leach)	Gui-i-ppal-dae-ching-l	
	3	<i>Lamprotula coreana</i> (v. Martens)	Du-deu-ruk-jo-gae	
Plants	1	<i>Cymbidium kanran</i> Makino	Han-lan	
	2	<i>Aerides japonicum</i> Rchb. f.	Na-do-pung-lan	
	3	<i>Cypripedium japonicum</i> Thunb.	Kwang-rung-yo-gang-kkot	
	4	<i>Ranunculus kousensis</i> Makino	Mae-hwa-ma-rum	
	5	<i>Cotoneaster wilsonii</i> Nakai	Sum-gae-ya-gwang-na-mu	
	6	<i>Diapensia lapponica</i> var. <i>obovata</i> F. Schmidt	Dol-mae-hwa-na-mu	

Note: Dhole (Asiatic wild dog with scientific name of “*Cuon alpinus*”) and ibis with scientific name of “*Nipponia nippon*” are international endangered species and believed to be extinct in Korea.

Table 13-2
Protected wild fauna and flora

Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Mammals	1	<i>Prionailurus bengalensis</i> (Kerr)	Sak	Leopard Cat
	2	<i>Martes flavigula</i> (Boddaert)	Dam-bi	Yellow-Throated Marten
	3	<i>Callorhinus ursinus</i> (Linnaeus)	Mul-gae	Northern Fur Seal
	4	<i>Eumetopias jubatus</i> (Schreber)	Keun-ba-da-sa-ja	Steller Sea Lion
	5	<i>Phoca largha</i> Pallas	Mul-bum	Spotted Seal
	6	<i>Phoca</i> spp.	Mul-bum-ryu	Seal
	7	<i>Pteromys volans</i> aluco Thomas	Ha-neul-da-ram-jui	Korean Small Flying Squirrel
Birds	1	<i>Gavia stellata</i> (Pontoppidan)	a-bi	Red-throated Diver
	2	<i>Phalacrocorax pelagicus</i> Pallas	Sue-ga-ma-u-ji	Pelagic Shag
	3	<i>Botaurus stellaris</i> (Linnaeus)	Al-lak-hae-o-la-ki	Bittern
	4	<i>Ixobrychus eurhythmus</i> (Swinhoe)	Keun-dum-bul-hae-o-la-ki	Schrenk's Least Bittern
	5	<i>Branta bernicla</i> (Linnaeus)	Heuk-ki-reo-ki	Brent Goose
	6	<i>Anser fabalis</i> (Latham)	Keun-ki-reo-ki	Bean Goose
	7	<i>Anser cygnoides</i> (Linnaeus)	Gae-ri	Swan Goose
	8	<i>Cygnus cygnus</i> (Linnaeus)	Keun-go-ni	Whooper Swan
	9	<i>Cygnus columbianus</i> (Ord)	Go-ni	Bewick's Swan
	10	<i>Anas formosa</i> Georgi	Ga-chang-o-ri	Baikal Teal
	11	<i>Mergus squamatus</i> Gould	Ho-sa-bi-o-ri	Chinese Merganser
	12	<i>Pandion haliaetus</i> (Linnaeus)	Mul-su-ri	Osprey
	13	<i>Pernis ptilorhynchus</i> (Temminck)	Bul-mae	Crested Honey Buzzard
	14	<i>Milvus lineatus</i> (J.E. Gray)	Sol-gae	Black-eared Kite
	15	<i>Accipiter gentilis</i> (Linnaeus)	Cham-mae	Goshawk
	16	<i>Accipiter gularis</i> (Temminck & Schlegel)	Jo-rong-l	Japanese Sparrowhawk

* NOTE: Protected species are defined by the scientific name. English names are provided for general understanding.

Table 13- 2 (Cont)
Protected wild fauna and flora

Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Birds	17	Buteo lagopus (Pontoppidan)	Tul-bal-mal-ddong-ga-ri	Rough-legged Buzzard
	18	Buteo hemilasius Temminck & Schlegel	Keun-mal-ddong-ga-ri	Upland Buzzard
	19	Buteo buteo (Linnaeus)	Mal-ddong-ga-ri	Buzzard
	20	Aquila clanga Pallas	Hang-la-meo-ri-geom-dok-su-ri	Great Spotted Eagle
	21	Aquila heliaca Savigny	Hin-juk-ji-su-ri	Imperial Eagle
	22	Aegypius monachus (Linnaeus)	Dok-su-ri	Cinereous Vulture
	23	Circus cyaneus (Linnaeus)	Jat-bit-gae-gu-ri-mae	Hen Harrier
	24	Circus melanoleucus (Pennant)	Al-lak-gae-gu-ri-mae	Pied Harrier
	25	Circus aeruginosus (Linnaeus)	Gae-gu-ri-mae	Marsh Harrier
	26	Falco subbuteo Linnaeus	Sae-hul-li-gi	Hobby
	27	Falco columbarius Linnaeus	Sue-hwang-jo-rong-l	Merlin
	28	Falco vespertinus Linnaeus	Bi-dul-gi-jo-rong-l	Red-footed Falcon
	29	Grus monacha Temminck	Heuk-du-ru-mi	Hooded Crane
	30	Grus vipio Pallas	Jae-du-ru-mi	White-napped Crane
	31	Gallicrex cinerea (Gmelin)	Ddeum-bu-gi	Watercock
	32	Otis tarda Linnaeus	Neu-shi	Great Bustard
	33	Haematopus ostralegus Linnaeus	Gum-eun-meo-ri-mul-dde-sae	Oystercatcher
	34	Charadrius placidus J.E. & G.R. Gray	Hin-mok-mul-dde-sae	Long-billed Ringed Plover
	35	Numenius madagascariensis (Linnaeus)	Al-lak-kko-ri-ma-do-yo	Australian Curlew
	36	Larus saundersi (Swinhoe)	Gum-eun-meo-ri-gal-mae-gi	Saunder's Gull
	37	Larus relictus Lonnberg	Jeok-ho-gal-mae-gi	Relict Gull
	38	Synthliboramphus wumizusume (Temminck)	Bbul-sue-o-ri	Japanese Murrelet
	39	Bubo bubo (Linnaeus)	Su-ri-bu-eong-i	Eagle Owl
	40	Strix uralensis (Pallas)	Kin-jeom-bak-l-ol-bbae-mi	Ural Owl
	41	Strix aluco (Linnaeus)	Ol-bbae-mi	Tawny Owl

Table 13-2 (Cont)
Protected wild fauna and flora

Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Birds	42	<i>Dryocopus martius</i> (Linnaeus)	Ka-mak-ddak-dda-gu-ri	Great Black Woodpecker
	43	<i>Dendrocopos canicapillus</i> (Blyth)	Ah-mul-sue-ddak-dda-gu-ri	Grey-headed Pygmy Woodpecker
	44	<i>Pitta nympha</i> (Linnaeus)	Pal-saek-jo	Fairy Pitta
	45	<i>Galerida cristata</i> (Linnaeus)	Bbul-jong-da-ri	Crested Lark
	46	<i>Terpsiphone atrocaudata</i> (Eyton)	Sam-kwang-jo	Japanese Paradise Flycatcher
Amphibians/ Reptiles	1	<i>Kaloula borealis</i> (Barbour)	Maeng-kkong-i	Korean Narrow-mouthed Frog
	2	<i>Rana chosenica</i> Okada	Kum-gae-gu-ri	
	3	<i>Chinemys reevesii</i> (Gray)	Nam-saeng-i	Reeve's Turtle
	4	<i>Agkistrodon saxatilis</i> (Emelianov)	Kka-chi-sal-mo-sa	Korean Magpie Viperine
Fish	1	<i>Lampetra reissneri</i> (Dybowski)	Da-muk-jang-eo	Sand Lamprey
	2	<i>Acheilognathus signifer</i> (Berg)	Muk-nab-ja-ru	Korean Bitterling
	3	<i>Microphysogobio koreensis</i> Mori	Mo-rae-ju-sa	Korean Gudgeon
	4	<i>Saurogobio dabryi</i> Bleeker	Du-u-jaeng-i	Asian Gudgeon
	5	<i>Iksookimia pumila</i> (Kim et Lee)	Bu-an-jong-gae	Buan Spine Loach
	6	<i>Coreoperca kawamebari</i> (Temminck et Schlegel)	Kkuk-juh-gi	Japanese Acha Perch
	7	<i>Niwaella brevifasciata</i> Kim et Lee	Jom-su-su-chi	Dwarf Spine Loach
Insects	1	<i>Nannophya pygmaea</i> Rambur	Kko-ma-jam-ja-ri	
	2	<i>Challia fletcheri</i> Burr	Ko-ryo-jip-gae-bul-lae	
	3	<i>Cicindela</i> (Chaetodera) <i>anchoralis</i> Chevrolat	Dat-mu-ni-gil-ap-jap-i	
	4	<i>Lethocerus deyrollei</i> (Vuillefory)	Mul-jang-gun	
	5	<i>Cicindela hybrida</i> <i>nitida</i> Lichtenstein	Ju-hong-gil-ap-jap-i	
	6	<i>Damaster mirabilissimus</i> <i>mirabilissimus</i> Ishikawa et Deuve	Mut-jo-rong-bak-ddak-jung-bul-lae	
	7	<i>Gymnopleurus mopsus</i> (Pallas)	So-ddong-gu-ri	

Table 13-2 (Cont)
Protected wild fauna and flora

Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Insects	8	<i>Chrysochroa fulgidissima</i> (Schoenherr)	Bi-dan-bul-lae	beetle
	9	<i>Psacotha hilaris</i> (Pascoe)	Ul-do-ha-neul-so	Yellow spotted longicorn beetle
	10	<i>Osmoderma opicum</i> Lewis	Keun-ja-saek-ho-rang-kkot-mu-chi	
	11	<i>Protantigius superans</i> (Oberthür)	Kip-eun-san-bu-jun-na-bi	
	12	<i>Spindasis takanonis</i> (Matsumura)	Ssang-kko-ri-bu-jun-na-bi	
	13	<i>Fabriciana nerippe</i> (C. et R. Felder)	Wang-eun-jum-pyo-bum-na-bi	
	14	<i>Parnassius bremeri</i> Bremer	Bul-keun-jum-mo-shi-na-bi	Red-spotted apollo butterfly
Invertebrate Animal	1	<i>Verrucella stellata</i> Nutting	Byul-heuk-san-ho	
	2	<i>Plexauroidea complexa</i> Nutting	Cheuk-maep-shi-san-ho	
	3	<i>Plexauroidea reticulata</i> (Esper)	Mang-sang-maep-shi-san-ho	
	4	<i>Euplexaura crassa</i> Kükenthal	Dun-han-jin-chong-san-ho	
	5	<i>Plumarella adhaerans</i> Nutting	Chak-saeng-git-san-ho	
	6	<i>Plumarella spinosa</i> Kinoshita	Git-san-ho	
	7	<i>Dendronephthya alba</i> Utinomi	Hin-su-ji-maen-deu-la-mi	
	8	<i>Dendronephthya castanea</i> Utinomi	Bam-su-ji-maen-deu-la-mi	
	9	<i>Dendronephthya mollis</i> (Holm)	Yeon-su-ji-maen-deu-la-mi	
	10	<i>Dendronephthya putteri</i> Kükenthal	Ja-saek-su-ji-maen-deu-la-mi	
	11	<i>Dendronephthya suenoni</i> (Holm)	Gum-bul-keun-su-ji-maen-deu-la-mi	
	12	<i>Dendrophyllia cribrosa</i> M. Edw. Et H.	Yu-chak-na-mu-dol-san-ho	
	13	<i>Dendrophyllia micranthus</i> (Ehrenberg)	Jan-ga-ji-na-mu-dol-san-ho	
	14	<i>Tubastraea coccinea</i> (Hemprich et Ehrenberg)	Jin-hong-na-pal-dol-san-ho	
	15	<i>Antipathes japonica</i> Brook	Hae-song	

Table 13-2 (Cont)

Protected wild fauna and flora

Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Invertebrate Animal	16	Scelidotoma vadososinuata hoonsooi Choe, Yoon et Habe	Jang-su-sat-gat-jo-gae	
	17	Ellobium chinensis (Pfeiffer)	Dae-chu-gui-go-dung	
	18	Clithon retropictus (v. Martens)	Gi-su-gal-go-dung	
	19	Triops longicaudatus (LeConte)	Gin-kko-ri-tu-gu-sae-u	
	20	Ophiacantha linea Shin et Rho	Sun-chim-guh-mi-bul-ga-sa-ri	
	21	Pseudomaretia alta (A. Agassiz)	Ui-yeom-tong-sung-gae	
Plants	1	Psilotum nudum (L.) Griseb.	Sol-ip-nan	
	2	Isoetes japonica A. Braun	Mul-bu-chu	
	3	Asplenium antiquum Makino	Pa-cho-il-yeop	
	4	Crypsinus hastatus(Thunb.) Copel.	Go-ran-cho	
	5	Arisaema negishii Makino	Sum-chun-nam-sung	
	6	Lilium cernuum Kom.	Sol-na-ri	
	7	Smilacina bicolor Nakai	Ja-ju-som-dae	
	8	Trillium tschonoskii Maxim.	Keun-yul-rung-cho	
	9	Lycoris chinensis var. sinuolata K.H. Tae et S.C. Ko	Jin-no-rang-sang-sa-hwa	
	10	Iris odaesanensis Y.N. Lee	No-rang-mu-ni-but-ggot	
	11	Iris dichotoma Pall.	Dae-chung-bu-chae	
	12	Cypripedium guttatum var. koreanum Nakai	Tul-gae-bu-ral-ggot	
	13	Galeola septentrionalis Rchb. f.	Eu-reum-nan-cho	
	14	Vexillabium nakainaum F. Maek.	Baik-un-nan	
	15	Gastrodia elata Blume	Chun-ma	
	16	Cymbidium nipponicum (Franch. et Sav.) Makino	Dae-hong-nan	
	17	Cymbidium lancifolium Hook.	Juk-baik-nan	

Table 13-2 (Cont)
Protected wild fauna and flora

Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Plants	18	Sarcanthus scolopendrifolius Makino	Ji-nae-bal-nan	
	19	Neofinetia falcate (Thunb.) Hu	Pung-nan	
	20	Saururus chinensis (Lour.) Baill.	Sam-baik-cho	
	21	Chloranthus glaber (Thunb.) Makino	Guk-jeul-cho	
	22	Quercus gilva Blume	Gae-ga-si-na-mu	
	23	Brasenia schreberi J.F. Gmel.	Sun-chaе	
	24	Thalictrum coreanum Lev.	Yeun-ip-kkeung-eui-da-ri	
	25	Aconitum austro-koreense Koidz	Sae-bbul-tu-gu-kkot	
	26	Paeonia obovata Maxim.	San-jak-yak	
	27	Jeffersonia dubia (Maxim.) Benth. et Hook.	Kkaeng-kkaeng-i-pul	
	28	Leontice microrhyncha S. Moore	Han-gae-ryung-pul	
	29	Wasabia koreana Nakai	Go-chu-naeng-i	
	30	Drosera peltata var. nipponica (Masam.) Ohwi	Kkeun-kkeun-l-gui-gae	
	31	Sedum rotundifolium D.B. Lee	Dung-keun-yip-kkeung-eui-bi-reum	
	32	Rodgersia tabularis Kom.	Gae-byung-pung	
	33	Kirengeshoma kireana Nakai	Na-do-seung-ma	
	34	Corylopsis coreana Uyeki	Hi-eo-ri	
	35	Echinosophora kireensis Nakai	Gae-neu-sam	
	36	Euchresta japonica Benth.	Man-nyun-kong	
	37	Milletia japonica (Siebold et Zucc.) A. Gray	Ae-gi-deung	
	38	Astragalus membranaceus (Fisch.) Bunge	Hwang-gi	
	39	Paliurus ramosissimus (Lour.) Poir.	Gaet-dae-chu	

Table 13-2 (Cont) Protected wild fauna and flora				
Classification	Designation No.	Scientific Name	Korean Common Name	English Common Name *
Plants	40	Berchemia berchemiaefolia (Makino) Koidz.	Mang-gae-na-mu	
	41	Hibiscus hamabo Siebold et Zucc.	Hwang-keun	
	42	Viola websteri Hemsl.	Yang-jae-bi-ggot	
	43	Eleutherococcus senticosus (Rupr. et Maxim.) Maxim.	Ga-si-o-gal-pi-na-mu	
	44	Bupleurum latissimum Nakai	Sum-si-ho	
	45	Rhododendron aureum Georgi	No-rang-man-byung-cho	
	46	Arctous ruber (Rehder et E.H. Wilson) Nakai	Hong-yeul-gul	
	47	Trientalis europaea L.	Ki-sang-ggot	
	48	Osmanthus insularis Koidz.	Bak-dal-mok-sae	
	49	Abeliophyllum distichum Nakai	mi-sun-na-mu	
	50	Scrophularia takesimensis Nakai	Sum-hyun-sam	
	51	Lasianthus japonicus Miq.	Mu-ju-na-mu	
	52	Leontopodium coreanum Nakai	Som-da-ri	

Table 13-3 Natural Ecosystem Preservation Areas
EIGHT AREAS DESIGNATED BY THE MINISTRY OF ENVIRONMENT
<p>1. Jiri Mountain Natural Ecosystem Preservation Area.</p> <p>a. Location: JunNam Guryegun, areas over Simwon valley at Sandongmyon and Pia valley at Tojeemyon.</p> <p>b. Size: 20.2 km².</p>
<p>2. Daeam Mountain Natural Ecosystem Preservation Area.</p> <p>a. Location: Kangwondo Injegun Seohwamyon, Daeam mountain areas.</p> <p>b. Size: 1.06 km².</p>
<p>3. Woopo Swamp Natural Ecosystem Preservation Area.</p> <p>a. Location: KyungNam Changnyungun, Woopo swamp areas over Daehapmyon, Yibangmyon, Yuamyon, and Daejimyon</p> <p>b. Size: 8.54 km².</p>
<p>4. The Mouth of the Nakdong River Natural Ecosystem Preservation Area.</p> <p>a. Location: Pusan City SahaGu, the sea extending over the whole of Shinpyung, Janglim, and Dadaedong.</p> <p>b. Size: 34.208 km².</p>
<p>5. Mujechi Swamp Natural Ecosystem Preservation Area.</p> <p>a. Location: Woolsan City WoolsanGun Samdongmyun, Joili Area.</p> <p>b. Size: 0.184km²</p>
<p>6. Sum Jin River Natural Ecosystem Preservation Area.</p> <p>a. Location: Jun Nam KyRye-Kun Mun Chuk-Myun, Kanjeon Myun and Toji Myun vicinity</p> <p>b. Size: 1.83km²</p>
<p>7. Kosanbong Red Bat Habitat Ecosystem Preservation Area.</p> <p>a. Location: Jun Nam Ham-pyung Kun, Dae-dong Myun vicinity</p> <p>b. Size: 8.78km²</p>
<p>8. Dong River Basin Ecosystem Preservation Area.</p> <p>a. Location: Kang Won Young Wol Kun Young Wol Euep, Jung Sun Kun Jung Sun Shin, Pyung Chang Kun, Miton Myun vicinity</p> <p>b. Size: 64.97km²</p>

Table 13-3 (Continued) Natural Ecosystem Preservation Areas
TWO AREAS DESIGNATED BY THE MARINE AFFAIRS AND FISHERIES
1. Shinduri Sand Hill Seashore Ecosystem Preservation Area. a. Location: Chung Nam Tae An Kun Won Buk Myun, Shinduri vicinity b. Size: 0.639km ²
2. Mun Island and Vicinity Seashore Ecosystem Preservation Area. a. Location: Jeju Seoguipo City Gang Jung dong, Bup Hwan dong, Seogui dong, Topyung dong, Bomok dong and vicinity b. Size: 13.684km ²

Table 13-3 (Continued) Natural Ecosystem Preservation Areas
EIGHT AREAS DESIGNATED BY THE GOVERNORS AND MAYORS
<p>1. DaeDuk Moutain and Keum Dae Bong Ecosystem Preservation Area. a. Location: Kang Won Tae Baek City, Sam Chuk Kun, Jung Sun Kun b. Size 4.20km²</p>
<p>2. Kwang Yang Baek Woon Moutain Ecosystem Preservation Area. a. Location: Jun Nam Kwang Yang Kun Ok Ryong Myun, Jin Sang Myun, Da App Myun b. Size: 9.74km²</p>
<p>3. Upstream of JoJong Chun, Myung Ji Moutain, Chung Ge Mountain Ecosystem Preservation Area. a. Location: Gyung Gi Ga Pyung Kun, Po Chun Kun b. Size: 21.84km²</p>
<p>4. Geo Je City Goran Cho Habitat Ecosystem Preservation Area. a. Location: Gyung Nam Geo Je City Ha Chung Myun Dugok Ri San 144-3 b. Size: 0.002km²</p>
<p>5. Han River Bam Island Ecosystem Preservation Area. a. Location: Seoul Young Dung Po Ku Yeo Ui Do Dong 84-4, MaPo Ku Dang In Dong 314 b. Size: 0.241km²</p>
<p>6. Dun Chon Dong Natural Wet Land Ecosystem Preservation Area. a. Location: Seoul Kang Dong Ku Dunchon Dong 211 b. Size: 0.005km²</p>
<p>7. Bang-I-Dong Wet Land Ecosystem Preservation Area. a. Location: Seoul Song Pa Ku Bang-I-Dong 439-2 b. Size 0.056km²</p>
<p>8. Tan Chon Ecosystem Preservation Area. a. Location: Seoul Song Pa Ku Ka Rak Dong, Kang Nam Ku Su Seo Dong b. Size: 1.405km²</p>

Chapter 14

POLYCHLORINATED BIPHENYLS

14-1. SCOPE.

This chapter contains criteria to control and abate threats to human health and the environment from the handling, use, storage and disposal of polychlorinated biphenyls (PCBs). These criteria include specific requirements for most uses of PCBs, including, but not limited to, transformers, capacitors, heat transfer systems, hydraulic systems, electromagnets, switches and voltage regulators, circuit breakers, reclosers, and cables.

14-2. DEFINITIONS.

- a. **Capacitor.** A device for accumulating and holding a charge of electricity and consisting of conducting surfaces separated by a dielectric.
- b. **In or near commercial buildings.** Within the interior of, on the roof of, attached to the exterior wall of, in the parking area serving, or within 30 meters of a non-industrial, non-substation building. Commercial buildings are typically accessible to both members of the general public and employees, and include--
 - (1) Public assembly properties.
 - (2) Educational properties.
 - (3) Institutional properties.
 - (4) Residential properties.
 - (5) Stores.
 - (6) Office buildings.
 - (7) Transportation centers (e.g., airport terminal buildings, subway stations, bus stations, or train stations).
- c. **Incinerator.** An engineered device using controlled flame combustion to thermally degrade PCBs and PCB items. Examples include rotary kilns, liquid injection incinerators, cement kilns, and high temperature boilers.
- d. **Leak or leaking.** Any instance in which a PCB article, PCB container, or PCB equipment has any PCBs on any portion of its external surface.
- e. **Mark.** The descriptive name, instructions, cautions, or other information applied to PCBs and PCB items, or other objects subject to this document.
- f. **Marked.** PCB items and PCB storage areas and transport vehicles marked by applying a legible mark by painting, fixation of an adhesive label, or by any other method that meets these criteria.
- g. **Non-PCB component.** Any component that contains less than 2 ppm PCB.
- h. **Non-PCB transformers.** Any transformer that contains less than 2 ppm PCB.
- i. **PCB article.** Any manufactured article, other than a PCB container, that contains PCBs and whose surface(s) has been in direct contact with PCB. This includes capacitors, transformers, electric motors, pumps, and pipes.
- j. **PCB article container.** Any package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB articles or PCB equipment, and whose surface(s) has not been in direct contact with PCBs.
- k. **PCB container.** Any package, can, bottle, bag, barrel, drum, tank, or other device that contains PCBs or PCB articles, and whose surface(s) has been in direct contact with PCBs.
- l. **PCB-contaminated electrical equipment.** Any electrical equipment including, but not limited to, transformers, capacitors, circuit breakers, reclosers, voltage regulators, switches, electromagnets, and cable, that contain 2 ppm or greater PCB, but less than 500 ppm PCB.

- m. **PCB equipment.** Any manufactured item, other than a PCB container or a PCB article container, which contains a PCB article or other PCB equipment, and includes microwave ovens, electronic equipment, and fluorescent light ballasts and fixtures.
- n. **PCB item.** Any PCB article, PCB article container, PCB container, or PCB equipment that deliberately or unintentionally contains or has as a part of it any PCB, or PCBs at a concentration of 2 ppm or greater.
- o. **PCB large high voltage capacitor** - a capacitor that contains 1.36 kg (3 lbs) or more of dielectric fluid and which operates at 2,000 volts (AC or DC) or above
- p. **PCB large low voltage capacitor** - a capacitor that contains 1.36 kg (3 lbs) or more of dielectric fluid and which operates below 2,000 volts (AC or DC).
- q. **PCB transformer.** Any transformer that contains 500 ppm PCB or greater.
- r. **Restricted access area.** Areas where access by unauthorized personnel is controlled by fences, other man-made structures or naturally-occurring barriers such as mountains, cliffs, or rough terrain.
- s. **Substantial contact area.** An area that is subject to public access on a routine basis or which could result in substantial dermal contact by employees.

14-3. CRITERIA.

- a. General.
 - (1) The installation spill contingency plan will address PCB items, including temporary storage items. Chapter 18, "Spill Prevention and Response Planning", provides criteria on how to prepare these plans.
 - (2) Spills of PCB liquids at concentrations of 2 ppm or greater will be responded to immediately upon discovery and cleaned up IAW the following:
 - (a) Surfaces that are located in substantial contact areas will be cleaned to 10 micrograms per 100 square centimeters.
 - (b) Surfaces in all other contact areas will be cleaned to 100 micrograms per 100 square centimeters.
 - (c) Contaminated soil will be removed to a minimum depth of 10 inches or until the soil tests no higher than 10 ppm PCBs, whichever is deeper, and will be backfilled with clean soil containing less than 1 ppm PCBs.
 - (3) All PCB Transformers, PCB Large High Voltage Capacitors, PCB Containers, and certain PCB items containing PCBs at concentrations 2 ppm or greater (i.e., electric motors using PCB coolants, hydraulic systems using PCB hydraulic fluid, and heat transfer systems using PCBs), as well as any PCB Article Containers used to store the preceding items, must be prominently marked in English and the Korean language. The marking must identify the item as containing PCBs, warn against improper disposal and handling, and provide a phone number in case of spills or if questions arise about disposal. This marking criteria also applies to rooms, vaults, and storage areas containing PCB Transformers or storing PCBs or PCB items for disposal. In addition, the following PCB items must be marked at the time of items' removal from use if not already marked: PCB Large Low Voltage Capacitors and equipment containing a PCB Transformer or PCB Large High Voltage Capacitor.
 - (4) Each installation having PCB items will maintain an inventory, and provide a electronic copy to the USFK EPO, that includes a current list by type of all PCB items in use with their laboratory test results, placed into storage for disposal or disposed of for that year. Inventory records should be maintained for a period of time at least 3 years after the last item on the list is disposed of.

- (5) PCBs are designated hazardous wastes. Disposal of PCB items will only be through the servicing Defense Reutilization and Marketing Office (DRMO) in accordance with DoD 4160.21-M, and paragraph 14-3.e. of this document.
 - (6) All periodic inspections as required in this chapter will be documented at the installation. Records of inspections and maintenance history will be maintained for four years after disposal of the transformer.
 - (7) Repair or replace leaking PCB transformers within 48 hours or as soon as possible. The PCB transformers not repaired or replaced will be inspected daily. Leaking PCB fluid will be containerized.
 - (8) All transformers and electrical equipment locally procured, regardless of source, shall be certified to be less than 2 ppm PCB.
 - (9) Transformers containing 50 ppm or greater PCB shall be phased out and replaced with new non-PCB transformers by 1 January 2005.
 - (10) Transformers and other equipment containing 2 ppm or greater PCB shall be phased out by 30 September 2011.
 - (11) Transformer fluids containing 2 ppm or greater PCB shall not be used in any application including servicing of existing transformers and other electrical system components.
 - (12) When dielectric fluid containing PCB between 2 and 50 ppm is disposed of, it will be regarded as PCB contaminated.
- b. The PCB transformers (500 ppm PCB or greater).
- (1) The PCB transformers will not be used in any application that poses a risk of contamination to food or feed.
 - (2) All PCB transformers, including those in storage for reuse, will be registered with the servicing fire department.
 - (3) The PCB transformers in use in or near commercial buildings or located in sidewalk vaults will be equipped with electrical protection to minimize transformer failure that would result in the release of PCBs.
 - (4) The PCB transformers removed and stored for reuse will only be returned to their original application and location and will not be used at another location unless there is no practical alternative; and any such alternative use will not exceed one year.
 - (5) The PCB transformers will be serviced as follows:
 - (a) Transformers classified as PCB-contaminated electrical equipment will only be serviced with dielectric fluid containing less than 2 ppm PCB.
 - (b) Any servicing of PCB transformers requiring removal of the transformer coil is prohibited.
 - (c) The PCBs removed during servicing will be captured and disposed of IAW subparagraph 14-3e.
 - (d) PCB transformers may be serviced with dielectric fluid at any PCB concentration. However, the dielectric fluid from a PCB transformer will not be mixed with the dielectric fluid from PCB-contaminated electrical equipment.
 - (e) Regardless of PCB concentration, dielectric fluids containing less than 500 ppm PCB that are mixed with fluids that contain 500 ppm or greater PCB will not be used as dielectric fluid in any electrical equipment. The entire mixture must be considered to be greater than 500 ppm PCB.
 - (f) Dielectric fluids containing 500 ppm or greater will not be used as dielectric fluid in any transformers classified as PCB-contaminated electrical equipment.
 - (g) All in-service PCB transformers (greater than 500 ppm) will be inspected at least every three months except that PCB transformers with impervious, undrained secondary containment capacity of 100 percent of dielectric fluid or

PCB transformers tested and found to contain less than 60,000 ppm PCBs will be inspected at least every 12 months.

- (6) If any PCB transformer is involved in a fire such that it was subjected to heat and/or pressure sufficient to result in violent or nonviolent rupture, the installation will take measures to control water runoff, such as blocking floor drains. Runoff water will be tested for PCB, dioxin and furan compounds and treated if required.
 - (7) Repair or replace leaking PCB transformers within 48 hours or as soon as possible. Leaking PCB transformers not repaired or replaced will be inspected daily. Leaking PCB fluid will be containerized.
 - (8) All transformers will be considered and treated as PCB transformers unless information to the contrary exists.
- c. Other PCB items.
- (1) Electromagnets, switches, and voltage regulators that may contain PCBs at any concentration are serviced as follows:
 - (a) The PCB-contaminated electrical equipment will only be serviced with dielectric fluid containing less than 500 ppm PCB.
 - (b) Servicing any electromagnet, switch, or voltage regulator with a PCB concentration of 500 ppm or greater which requires the removal and rework of the internal components is prohibited.
 - (c) The PCBs removed during servicing will be captured and either reused as dielectric fluid if less than 50 ppm or disposed of properly.
 - (d) The PCBs from electromagnets, switches, and voltage regulators with a PCB concentration of 500 ppm or greater will not be mixed with or added to dielectric fluid from PCB-contaminated electrical equipment.
 - (e) Dielectric fluids containing 500 ppm or greater will not be used as dielectric fluid in any electromagnet, switch, or voltage regulator classified as PCB-contaminated electrical equipment.
 - (2) Capacitors may contain PCBs at any concentration if they are serviced as follows:
 - (a) Use and storage for reuse of PCB large high-voltage capacitors and PCB large low-voltage capacitors which pose an exposure risk to food or feed is prohibited.
 - (b) Use of PCB large high-voltage and PCB large low-voltage capacitors is prohibited unless the capacitor is used within a restricted-access electrical substation or in a contained and restricted-access indoor installation. The indoor installation will not have public access and will have an adequate roof, walls, and floor to contain any release of PCBs.
 - (3) When replacing fluorescent light ballasts:
 - (a) Look for the "No PCB" label.
 - (b) Unmarked ballasts should be classified either PCB ballasts or determined to be PCB free.
 - (4) Any PCB item removed from service will be marked with the date it is removed from service.
- d. Storage.
- (1) The PCBs and PCB items at concentrations 2 ppm or greater that are to be stored before disposal will be stored in a facility that will assure the containment of PCBs, including--
 - (a) Roofs and walls of storage buildings that exclude rainfall.
 - (b) A containment berm, at least 6 inches high, sufficient to contain twice the internal volume of the largest PCB article or 25 percent of the total internal volume of all PCB articles or containers stored, whichever is greater.

- (c) Drains, valves, floor drains, expansion joints, sewer lines or other openings constructed to prevent any release from the bermed area.
 - (d) Continuous, smooth and impervious flooring and containment berm material.
 - (e) To the maximum extent possible, a new PCB storage area will be located to minimize the risk of release due to seismic activity, floods, or other natural events. For facilities located where they may face such risks, the installation spill prevention and control plan will address the risk.
 - (2) The following items may be stored temporarily in an area, subject to weekly inspection, that does not comply with the above requirements for up to 30 days from the date of removal from service:
 - (a) Non-leaking PCB items, marked to indicate whether it is a PCB article or PCB equipment.
 - (b) Leaking PCB articles and PCB equipment placed in a non-leaking PCB container that contains sufficient absorbent material to absorb fluid contained on the PCB article or equipment.
 - (c) The PCB containers in which non-liquid PCBs have been placed.
 - (d) The PCB containers in which PCBs at a concentration between 50-499 ppm have been placed and containers marked to indicate less than 500 ppm PCB.
 - (3) Non-leaking and structurally-undamaged large high-voltage PCB capacitors and PCB-contaminated electric equipment that have not been drained of free-flowing dielectric fluid may be stored on pallets, or raised platforms, next to a storage area meeting subparagraph 14-3e, if they are inspected weekly.
 - (4) All other PCB storage areas will be inspected at least monthly.
 - (5) Containers used for the storage of PCBs will be at least as secure as those required for their transport for disposal by the servicing DRMO. UN packaging Group II containers are recommended. These United Nations packing group II containers meet specifications described in Title 49 Code of Federal Regulation (CFR) Part 171-8 and the Hazardous Material Table at 49 CFR 172-101.
- e. Disposal.
- (1) Installations that generate PCB waste of 2 ppm or greater PCB will maintain an audit trail for the wastes at least as stringent as that required under the criteria in Chapter 6.
 - (2) Disposal of PCB items will only be through the servicing DRMO IAW DOD 4160.21-M. Disposal of PCBs within Korea requires coordination with and concurrence of appropriate Korean authorities.
 - (3) PCB-contaminated dielectric fluid of concentrations of 2 ppm or greater PCB will only be disposed of in a high temperature incinerator with 99.9 percent combustion efficiency.
 - (4) PCB contaminated transformers, PCB articles, PCB containers, rags, soils, and other debris contaminated with PCBs at concentrations of 50 ppm or greater; by EPA-600/4-87-045, "The Determination of Polychlorinated Biphenyls in Transformer Fluid and Waste Oils" or equivalent test method, will be disposed of in an high temperature incinerator with 99.9 percent combustion efficiency as defined in Chapter 6.
 - (5) Retrogrades of PCBs. DOD-generated PCBs manufactured in the U.S. will be returned to CONUS for delivery to a permitted disposal facility if ROK or third country disposal is not possible, is prohibited or will not be managed in an environmentally sound manner. Ensure that all PCB items and equipment are marked in accordance with criteria in subparagraph 14-3a(3).
- f. Elimination of PCB products.

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- (1) Installations shall minimize the use of PCBs and PCB items without degrading mission performance.
- (2) Installations shall not purchase or otherwise take control of PCBs or PCB items for use.
- (3) All procurement of transformers or any other equipment containing dielectric or hydraulic fluid shall be accompanied by manufacturer's certification that the equipment contains no detectable PCBs (less than 2 ppm) at the time of shipment.
- (4) Such newly procured transformers and equipment shall have permanent labels affixed stating they are PCB free (no detectable PCBs).

Chapter 15 ASBESTOS

15-1. SCOPE.

This chapter contains criteria to control and abate threats to human health and the environment from asbestos, and describes proper management of asbestos during removal and disposal. Comprehensive Occupational Health and Safety program policy and requirements are *not* covered in this chapter. To protect personnel from asbestos exposure, please refer to DoDI 6055.1, "DoD Occupational Safety and Health Program," and DoDI 6055.5, "Industrial Hygiene and Occupational Health," and concomitant service instructions.(AR 40-5, *Preventive Medicine*; AF/Navy/Marine publications)

15-2. DEFINITIONS.

- a. **Adequately Wet.** Sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from ACM, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.
- b. **Asbestos.** Generic term used to describe six distinctive varieties of fibrous mineral silicates, including chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any other of these materials that have been chemically treated and/or altered.
- c. **Asbestos-Containing Material (ACM).** Any material containing more than one percent asbestos by weight.
- d. **Asbestos-containing waste material (ACWM):** As applied to demolition and renovation operations, ACWM includes (a) all friable asbestos waste, (b) Category I non-friable asbestos that has become friable or is in poor condition, (c) non-friable ACM that becomes crumbled, pulverized, or reduced to powder by forces that acted on the material during the course of demolition or renovation operations, and (d) materials contaminated with asbestos including disposal equipment and clothing.
- e. **Category I non-friable ACM:** Asbestos-containing packings, mastic, gaskets, resilient floor covering and asphalt roofing products in accordance with the Asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP). Category I non-friable asbestos is not subject to regulation unless it (a) has been subjected to sanding, grinding, cutting, or abrading, (b) has become friable, or (c) is in poor condition.
- f. **Category II non-friable ACM:** Any non-friable material not designated as Category I, in accordance with the Asbestos NESHAP. Some examples of Category II non-friable ACM are cementitious asbestos board (transite), acoustical ceiling tiles, flex connectors, expansion joints, caulking material, and textured paint.
- g. **Composite sample:** Multiple layers of a single core sample are composited for analysis. A composite sample does NOT combine multiple individual samples to obtain a single result.
- h. **Friable Asbestos.** Any material containing more than one percent asbestos that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure.
- i. **Joint compound:** The material used to fill nail holes, cracks, and small spaces between sections of wallboard.
- j. **Multi-layered interior wall system:** A system that contains multiple layers of material, any or all of which may be ACM.
- k. **Non-friable asbestos:** A material containing more than one percent asbestos as determined using Polarized Light Microscopy (PLM) that when dry cannot be crumbled, pulverized, or reduced to powder by hand pressure.

- l.* **Regulated asbestos-containing material (RACM):** Includes (a) friable asbestos material, (b) Category I non-friable ACM that has become friable or has been/will be subjected to sanding, grinding, cutting or abrading, and (c) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder in the course of demolition or renovation operations.

15-3. CRITERIA.

- a.* Installations will appoint an asbestos program manager to serve as the single point of contact for all asbestos-related activities.
- b.* Installations will prepare and implement an asbestos management plan. Service components may elect to standardize and publish procedures that may be used as a common component for the asbestos management plans of multiple installations. As a minimum, the plan will include the following:
 - (1) An ACM inventory, conducted by sample and analysis or visual determination;
 - (2) A notification and education program to tell workers, tenants, and building occupants where potentially friable ACM is located, and how and why to avoid disturbing the ACM; all persons affected should be properly informed;
 - (3) Regular ACM surveillance to note, assess, and document any changes in the ACM's condition;
 - (4) Work control/permit systems to control activities which might disturb ACM;
 - (5) Operations and maintenance (O&M) work practices to avoid or minimize fiber release during activities affecting ACM;
 - (6) Record keeping to document O&M activities related to asbestos identification management and abatement;
 - (7) Training for the asbestos program manager as well as custodial and maintenance staff;
 - (8) Procedures to assess and prioritize identified hazards for abatement; and
 - (9) Procedures to prevent the use of ACM in new construction.
 - (10) Medical surveillance and respiratory protection programs required to support all personnel involved in asbestos related activities, please refer to 29 CFR 1926.1101 (h).
- c.* Prior to the demolition or renovation of a facility, the installation will make a determination whether or not the activity will remove or disturb ACM, and will record this determination on the project authorization document (e.g., work order).
- d.* Prior to the demolition or renovation of a facility that involves removing or disturbing friable ACM, a written assessment of the action will be prepared and furnished to the installation commander. A copy of the assessment will also be kept on permanent file.
- e.* Installations will remove friable ACM when it poses a threat to release airborne asbestos fibers and cannot be reliably repaired or isolated.
- f.* Prior to disturbing or demolishing any part of a facility, all friable ACM and Class II non-friable ACM with a high degree of probability of becoming friable will be removed.
- g.* If in-house abatement is performed, installations will as a minimum--
 - (1) Prior to removal, train all workers involved in the removal.
 - (2) Establish monitoring programs during asbestos removal operations to document exposure levels.
 - (3) Ensure that all workers involved in the removal use properly fitted respiratory protection and personal protection equipment.
 - (4) Use engineering controls and work practices to contain and control asbestos fiber releases for all asbestos removal that has the potential to release airborne asbestos fibers greater than the PEL of 0.1 fibers/cc.

- h. When disposing of ACWM, material shall be adequately wetted, sealed in a leak proof container, and properly disposed of thru a licensed Designated Waste Disposal contractor in accordance with ROK environmental laws and regulations. Waste asbestos shall also be collected and transported in a bag made of polyethylene of similar material to prevent their scattering and the cargo for its transportation shall be covered. In storage, waste asbestos shall be humidified and double wrapped with sacks, sealed in a sturdy container, or solidified with cement or synthetic polymer compounds, or by similar methods, not to be scattered during storage. Containers shall be labeled in both English and Korean language: "*DANGER - CONTAINS ASBESTOS FIBERS - AVOID CREATING DUST - CANCER AND LUNG DISEASE HAZARD.*" Permanent records documenting the disposal action and site shall be maintained.
- i. For demolition projects, Category I non-friable ACM is not required to be removed prior to demolition if the material is in good condition and is not friable. During the demolition process, the material may be combined with the rest of the demolition debris and disposed of as ordinary construction waste.
- j. For renovation projects, Category I non-friable ACM within the renovation area must be removed prior to renovation activities. The ACM waste should be placed in a leak-proof container and labeled (in English and Korean languages) "*This debris complies with ROK Presidential Degree of Solid Waste Management Act, Table 1, Types of Designated Waste (No. 7a). Do Not Crush or Grind Prior To Disposal.*" The ACM waste can be disposed of as ordinary construction waste, with the provision that the waste not be subjected to crushing or grinding at the landfill.
- k. DoD schools will comply with applicable requirements 15 U.S.C. 2643(l) and implementing regulations in 40 CFR Part 763, Subpart E.
- l. Sampling of multi-layered interior wall systems.
 - (1) Multi-layered interior wall systems including joint compound and skim coats. Discrete layers are combined to produce a composite analytical result. If the composite result is less than or equal to one percent, then the sampled material is not classified as ACM and no further analysis is required. If the composite result is greater than one percent, then the sampled material is considered to be ACM.
 - (2) Multi-layered interior wall systems not including joint compound. If asbestos content is greater than one percent, the material is classified as ACM. If no asbestos is detected in the composite sample, then the material is classified as non-ACM. However, if the analysis detects asbestos up to one percent, then each layer of the sample must be analyzed individually. If any one layer contains greater than one percent asbestos, then that layer is classified as ACM. If it is infeasible or impossible to separate the layers, then the entire sample is then considered to be ACM. As an alternative to the standard PLM method, and if available, composite samples may be gravimetrically analyzed to derive the percentage of asbestos by weight.
- m. Exterior Textured Paint. ACM exterior textured paint is considered Category II non-friable ACM.
 - (1) For renovation projects, routine abatement and disposal procedures shall be followed when the impact of renovation activities may result in the release of significant levels of airborne asbestos fibers.
 - (2) For demolition projects, ACM paint does not have to be removed or abated if the paint is in good condition, is non-friable, and is well-bonded to the wall matrix. In such cases, the paint shall be left in place and disposed of as ordinary construction debris along with the rest of the building debris. If the paint is in poor condition, has become friable, or is poorly bonded to the wall matrix, then it must be removed

in accordance with the appropriate asbestos abatement and waste disposal procedures.

15-4. TRAINING.

All personnel engaged in asbestos-related activities, including the program manager, shall maintain US EPA accreditation commensurate with their asbestos-related duties and responsibilities.

- a. 16-Hour EPA Operations and Maintenance. This course is required for maintenance and custodial staff who conduct activities that may disturb asbestos or presumed asbestos containing materials. It is an ideal program for plumbers, electricians, air conditioning, heating personnel, and maintenance personnel.
- b. 2-Day EPA AHERA Management Planner. The 3-day EPA AHERA Inspector certification course is a prerequisite for this course. This course provides the requisite information necessary to create an asbestos management plan and correctly assess the hazards of in-place management of asbestos-containing material (ACM).
- c. 2-Day Abatement Project Monitor. Asbestos abatement projects that require a project monitor are projects performed in occupied buildings or in buildings intended for occupation upon completion of the abatement project. The building owner may also deem it necessary for abatement projects to be monitored. This course is required for individuals who will be observing and monitoring the activities of an asbestos abatement contractor to determine that proper work practices are used and that compliance with applicable asbestos laws and regulations is maintained. Other project monitor duties include collecting abatement air samples, performing visual inspections of the work area, and performing final clearance after the scope of work is completed.
- d. 2-Hour Asbestos Awareness. This course is required for all individuals who work in areas where they may come into contact with asbestos. It provides the "basics" on asbestos hazards in buildings, and applies to all maintenance and custodial staff. This course provides the minimum level of training necessary for an individual to enter an asbestos regulated area. The course may be presented in combination with other training requirements such as Lead Awareness, Respiratory Protection and Hazard Communication.
- e. 3-Day EPA AHERA Inspector. This course covers the essential skills of performing comprehensive asbestos inspections in schools, public buildings, and commercial buildings. The course is based on the Asbestos Hazard Emergency Response Act (AHERA) protocol.
- f. 3-Day EPA AHERA Project Designer. This course is required for all individuals who will design any asbestos abatement activity. Classroom presentations, and realistic case study scenarios, provide participants with a solid foundation for developing responsible and efficient asbestos abatement project designs, specifications and work plans.
- g. 4-Day EPA AHERA Worker. This course is designed for workers engaged in the abatement of asbestos-containing materials (ACM). Classroom instruction is combined with practical hands-on activities to provide participants with a thorough understanding of the asbestos abatement workplace.
- h. 5-Day EPA AHERA Supervisor. This course is required of individuals to supervise an asbestos abatement project. It is ideal training for building owners, regulatory officials, industrial technicians and safety officers who need to knowledgeable of the details of abatement projects. All students must participate in detailed hands-on activities and desktop scenarios.

Chapter 16
RADON - RESERVED

Chapter 17

Lead-Based Paint (LBP)

17-1. SCOPE.

This chapter contains criteria to establish and implement a lead hazard management program to identify, control or eliminate lead-based paint hazards, through interim controls or abatement, in child-occupied facilities and military family housing, in a manner protective of human health and the environment. Policy requirements for a comprehensive Occupational Health and Safety program are not covered in this chapter. To protect personnel from lead exposure, refer to DoDI 6055.1, DoD Occupational Safety and Health Program, and DoDI 6055.5, Industrial Hygiene and Occupational Health and concomitant service instructions.

17-2. DEFINITIONS.

- a. **Abatement.** Any set of measures designed to permanently eliminate lead-based paint or lead-based paint hazards. Abatement includes the removal of lead-based paint and lead-contaminated dust, the permanent enclosure or encapsulation of lead-based paint, the replacement of components or fixtures painted with lead-based paint, and the removal or covering of lead-contaminated soil. Abatement also includes all preparation, cleanup, disposal, and post-abatement clearance activities associated with such measures.
- b. **Accessible Surface.** An interior or exterior surface painted with lead-based paint that is accessible for a young child to mouth or chew.
- c. **Bare Soil.** Soil, including sand, not covered by grass, sod, or other live ground covers, or by wood chips, gravel, artificial turf, or similar covering.
- d. **Child-Occupied Facility.** A facility, or portion of a facility, visited regularly by the same child, 6 years of age or under, on at least two different days within any week, provided that each day's visit lasts at least 3 hours and the combined weekly visits last at least 6 hours, and the combined annual visits last at least 60 hours. Child-occupied facilities may include, but are not limited to, day-care centers, preschools, playgrounds, and kindergarten classrooms.
- e. **Clearance.** Visual evaluation and testing (collection and analysis of environmental samples) conducted after lead-based paint hazard reduction activities, interim controls, and standard treatments to determine that the work is complete and no lead-contaminated bare soil or lead-contaminated settled dust exists in a facility in which children under the age of 6 frequent.
- f. **Deteriorated Paint.** Any interior or exterior paint or other coating that is peeling, chipping, chalking, cracking or is otherwise damaged or separated from the substrate.
- g. **Elevated Blood Lead Level.** A confirmed concentration of lead in whole blood of 20 µg/dl (micrograms of lead per deciliter) for a single test, or of 15-19 µg/dl in two tests taken at least 3 months apart.
- h. **Encapsulation.** The application of any covering or coating that acts as a barrier between the lead-based paint and the environment. Encapsulation may be used as a method of abatement if it is designed to be permanent.
- i. **Enclosure.** The use of rigid, durable construction materials that are mechanically fastened to the substrate in order to act as a barrier between lead-based paint and the environment. Enclosure may be used as a method of abatement if it is designed to be permanent.
- j. **Evaluation.** A visual evaluation, risk assessment, risk assessment screen, paint inspection, paint testing, or a combination of risk assessment and paint inspection to

determine the presence of deteriorated paint, lead-based paint, or a lead-based paint hazard.

- k. **Friction Surface.** An interior or exterior surface that is subject to abrasion or friction, including but not limited to, window, floor, and stair surfaces.
- l. **Hazard Reduction.** Measures designed to reduce or eliminate human exposure to lead-based paint hazards through methods including interim controls or abatement or a combination of the two.
- m. **Impact Surface.** An interior or exterior surface that is subject to damage by repeated sudden force, such as certain parts of door frames.
- n. **Interim Controls.** A set of measures designed to temporarily reduce human exposure or likely exposure to lead-based paint hazards. Interim controls include, but are not limited to, repairs, occasional and ongoing maintenance, painting, temporary containment, specialized cleaning, clearance, ongoing activities, and the establishment and operation of management and resident education programs.
- o. **Lead-Based Paint.** Paint or other surface coatings that contain lead equal to or exceeding 1.0 milligram per square centimeter, or 0.5 percent by weight or 5,000 parts per million (ppm) by weight.
- p. **Lead-Based Paint Hazard.** Any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, or lead-contaminated paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces, and that would result in adverse human health effects.
- q. **Lead-Based Paint Inspection.** A surface-by-surface investigation to determine the presence of lead-based paint and the provision of a report explaining the results of the investigation.
- r. **Lead-Contaminated Dust.** Surface dust that contains an area concentration of:

Surface Concentrations		
Floors ($\mu\text{g}/\text{ft}^2$)	Interior Window Sills ($\mu\text{g}/\text{ft}^2$)	Window Troughs($\mu\text{g}/\text{ft}^2$)
100	500	800
Notes:		
"Floors" includes carpeted and uncarpeted floors.		
For metric units, $1 \mu\text{g}/\text{ft}^2 = 0.01076 \text{ mg}/\text{sq.m.}$; thus $250 \mu\text{g}/\text{ft}^2 = 2.7 \text{ mg}/\text{sq.m.}$, etc.		

- s. **Lead-Contaminated Soil.** Bare soil containing lead at or exceeding a concentration of 400 ppm in high contact play areas, or 2000 ppm in areas where contact by children is less likely or frequent.
- t. **Permanent.** An expected design life of at least 20 years.
- u. **Reevaluation.** A visual evaluation of painted surfaces and limited dust and soil sampling conducted periodically following lead-based paint hazard reduction where lead-based paint is still present.
- v. **Replacement.** A strategy of abatement that entails removing building components that have surfaces coated with lead-based paint (such as windows, doors, and trim) and installing new components free of lead-based paint.
- w. **Risk Assessment.** An on-site investigation to determine the existence, nature, severity, and location of lead-based paint hazards and the provision of a report explaining the results of the investigation and options for reducing lead-based paint hazards.
- x. **Risk Assessment Screen.** A sampling protocol that is used in dwellings that are in relatively good condition and where the probability of finding lead-based hazards are low. The protocol involves inspecting such dwellings and collecting samples from representative locations on the floor, interior window sills, and window troughs to determine whether conducting a risk assessment is warranted.

17-3. CRITERIA.

a. Installations will:

- (1) Develop and implement a multi-disciplinary lead-based paint hazard management program to identify, evaluate, and reduce lead-based paint hazards in child-occupied facilities and military family housing. Table 17-1 provides examples of where lead hazards may be present.

Table 17-1: Potential Lead Hazard Areas			
Interior	Floors	Entryways	Cabinets
	Window Wells	Heavy Traffic Areas	
	Window Sills	Stairways	
Exterior	Walls	Drip Line	
	Entrances	Play Areas	
Common Areas	Mailroom	Laundry Room	Playroom
	Community Room	Entrances	

- (2) Manage identified lead-based paint hazards through interim controls or abatement.
- (3) Identify lead-based paint hazards in child-occupied facilities and military family housing using any or all of the following methods:
 - (a) Lead-based paint risk assessment screen. If screen identifies dust-lead levels $>50 \mu\text{g}/\text{ft}^2$ for floors, $250 \mu\text{g}/\text{ft}^2$ for interior window sills, or $400 \mu\text{g}/\text{ft}^2$ for window troughs, perform lead-based paint risk assessment
 - (b) Lead-based paint risk assessments.
 - (c) Routine facility inspection for fire and safety.
 - (d) Occupant, facility manager, and worker reports of deteriorated paint.
 - (e) Results of childhood blood lead screening or reports of children identified to have elevated blood lead levels.
 - (f) Lead-based paint reevaluations.
 - (g) Review of construction, painting, and maintenance histories.
- (4) Ensure occupants and worker protection measures are taken during all maintenance, repair, and renovation activities that disturb areas known or assumed to have lead-based paint.
- (5) Disclose to occupants of child-occupied facilities and military family housing the presence of any known lead-based paint or lead-based paint hazards and provide information on lead-based paint hazard reduction. In addition, inform occupants of military family housing, prior to conducting remodeling or renovation projects, of the hazards associated with these activities, and provide information on protecting family members from the hazards of lead-based paint.
- (6) Ensure that all personnel involved in lead-based activities, including paint inspection, risk assessment, specification or design, supervision, and abatement, are properly trained. The following training for the specified types of personnel are considered proper training.
 - (a) **Lead Abatement Worker...**This training, typically one day long, is designed for the lead abatement and lead risk reduction worker. The course covers current abatement issues affecting the worker.
 - (b) **Lead Risk Assessor.** Certified Lead Inspector Technicians are eligible for the Risk Assessor training. This training is typically two days long. After completing the course the student will be able to determine the presence, or absence, of lead based paint hazards and recommend options for lead hazard control.

- (c) **Maintenance and Repainting Supervisor.** This training, typically two days long, is designed for those who will supervise work activities that may disturb lead-based paint by home improvement contractors and others in affected properties. Detailed hands-on activities allow students the opportunity to become comfortable with performing risk reduction procedures.
 - (d) **Lead Inspector Technician.** This training is typically 3 days in length. Students learn the sampling protocols for XRFs, paint chips, dust, and soil. Hands-on activities include XRF operation, paint chip sampling, dust wipe sampling, soil sampling, substrate corrections and random sampling in multi-family units.
 - (e) **Lead Abatement Supervisor.** This course, typically four days in length, is for personnel who directly supervise lead abatement operations, lead risk reduction operations and accredited lead paint abatement workers.
- (7) Dispose of lead-contaminated waste that meets the definition of a hazardous waste in accordance with Chapter 6 paragraph 6-2f.
- b. Maintenance Operations: Properly trained personnel should only perform maintenance operations, including repainting (see section 20-4). Proper cleaning practices involving special cleaning with HEPA vacuums and TSP wash or an equivalent cleaning solution should be performed. Maintenance operations should be evaluated for:
 - (1) Building or housing code violations
 - (2) Paint conditions
- c. Renovation or modernization of older facilities is an excellent time to either abate the lead hazards on a property or to perform risk reductions of LBP hazards.
- d. Repaint facilities with LBP at a minimum of every 5 years. More frequent repainting should be performed if the paint appears in poor condition. The following precautions should be taken when repainting LBP:
 - (1) Use a lead-specific cleaner or deglossing agent to prepare the surface
 - (2) Alternately, surface preparation can be performed by wet sanding/wet scraping
 - (3) HEPA vacuuming with TSP wash or equivalent should be performed following any repainting.
- e. The following are permissible methods of abating lead hazards in residential facilities.
 - (1) Replacement
 - (2) Off-site chemical stripping
 - (3) Heat gun
 - (4) On-site chemical stripping
 - (5) Sander with HEPA vacuum
 - (6) Wet scraping
 - (7) Encapsulation with approved materials
 - (8) Reversal
 - (9) Vacuum-blasting (exterior only)
 - (10) Contained hydro-blasting (exterior only)
- f. The following are not permissible methods of abating lead hazards in residential facilities.
 - (1) Open flame burning
 - (2) Dry sanding
 - (3) Open abrasive blasting
 - (4) Uncontained hydro-blasting
 - (5) Methylene chloride for interior use
 - (6) Dry scraping

- g.* The following are permissible methods of abating lead hazards in nonresidential facilities (including structural steel projects).
- (1) Abrasive blasting with dust recovery and filtration system
 - (2) Mechanical chipping with dust collection system
 - (3) Needle gun with HEPA vacuum
 - (4) Demolition methods

Chapter 18

SPILL/EVENT PREVENTION, RESPONSE PLANNING, AND REPORTING

18-1. SCOPE.

This chapter contains criteria to plan for, prevent, control and report spills of POL and hazardous substances, as well as other events that cause environmental contamination. It is USFK policy to prevent spills of these substances due to USFK activities and to provide for prompt, coordinated response to contain and clean up spills that might occur. Remediation beyond that required for the initial response is conducted pursuant to DoDI 4715.8, "Environmental Remediation for DoD Activities Overseas".

18-2. DEFINITIONS.

- a. **Environmental Points of Contact.** ROK Ministry of Environment and USFK have established and exchanged points of contact lists for local officials and military installations that will enable both sides to notify each other in case of a reportable environmental event. Points of contact will be updated as necessary by MOE and USFK ACofS Engineer.
- b. **Facility Incident Commander (FIC).** (previously known as the Installation On-scene Coordinator (IOSC)) The official who coordinates and directs USFK control and cleanup efforts at the scene of a POL or hazardous substance spill due to USFK activities on or near the installation. This official is designated by the installation commander.
- c. **Facility Response Team (FRT).** (previously known as the Installation Response Team (IRT)) A team performing emergency functions as defined and directed by the FIC.
- d. **Hazardous substance.** Any substance having the potential to do serious harm to human health or the environment if spilled or released in reportable quantity. A list of these substances and the corresponding reportable quantity is contained in Table B-4, Appendix B. The term does not include:
 - (1) Petroleum, including crude POL or any fraction thereof, that is not otherwise specifically listed or designated as a hazardous substance above.
 - (2) Natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).
- e. **Oil.** POL of any kind or in any form, including, but not limited to, petroleum, fuel POL, sludge, POL refuse and POL mixed with wastes other than dredged spoil.
- f. **POL.** Refined petroleum, oils, and lubricants.
- g. **Reportable environmental event to ROK.** These events include those that have known, imminent and substantial endangerment to the public safety, human health or the natural environment, on the other side of the boundary between a USFK facility or area and the surrounding ROK territory. These events also include those solely on one side of the boundary that cause significant contamination.
- h. Reportable environmental event within USFK. Events including, but not limited to:
 - (1) Any event included in para 18-2.g. above;
 - (2) Any spill included under para 18-2.i. below; and
 - (3) Any wastewater discharge that does not meet criteria in Chapter 4;
- i. **Significant spill.** An uncontained release to the land or water in excess of any of the following quantities:
 - (1) For hazardous waste or hazardous substance identified as a result of inclusion in table B-3, any quantity in excess of the reportable quantity listed in table B-4;

- (2) For POL or liquid or semi-liquid hazardous material, HW or hazardous substance, in excess of 400 liters (110 gallons);
 - (3) For other solid hazardous material, in excess of 225 Kg (500 pounds); or
 - (4) For combinations of POL and liquid, semi-liquid and solid hazardous materials, HW or hazardous substance, in excess of 340 Kg (750 pounds).
 - (5) If a spill is contained inside an impervious berm, or on a nonporous surface, or inside a building and is not volatilized and is cleaned up, the spill is considered a contained release and is not considered a significant spill.
- j. **Worst Case Discharge.** The largest foreseeable discharge from the facility, under adverse weather conditions, as determined using as a guide the worst-case discharge planning volume criteria at Appendix C.

18-3. CRITERIA.

- a. Notification of events between the local governments and military installations should be accomplished concurrently with notification to the reporting party's central level authority. These events include those that have known, imminent and substantial endangerment to the public safety, human health or the natural environment, on the other side of the boundary between a USFK facility or area and the surrounding ROK territory. These events also include those solely on one side of the boundary that cause significant contamination. US Government officials at the local level should communicate these events to the designated ROK Government official at the local level, and up US Command channels to USFK, Engineer, concurrently. Similarly, ROK Government officials at the local level should communicate these events to the designated US Government official at the local level, and up ROK Governmental channels to MOE, concurrently. Central level notification will be provided by the Chairperson of the US component, SOFA Environmental Subcommittee to the Chairperson of the ROK component, SOFA Environmental Subcommittee, or vice-versa.
- b. The agency with reporting responsibility at the local level for the event, whether US or ROK, should communicate events as soon as possible by telephone to the local point of contact and concurrently up channels to the reporting agency's central level authority. That notification should be followed within 48 hours by written notification. A copy of that written notification should be forwarded from the responsible US or ROK agency up national channels to the US or ROK, Co-Chairperson of the SOFA Environmental Subcommittee. The Co-chairpersons of the SOFA Environmental Subcommittee, if appropriate, will establish a working group to address the event within 10 days of the notification. Each of the Co-chairpersons of the SOFA Environmental Subcommittee will determine his representatives to the working group including a working group co-chairperson. The working group co-chairpersons should report to the Co-chairpersons of the SOFA Environmental Subcommittee within 10 days of the completion of working group discussions.
- c. Local Government and USFK Installation authorities will cooperate with each other in taking appropriate measures immediately to prevent the diffusion of pollution when an event occurs. This will include exchange of information that is necessary for the other party to take appropriate response measures to the specific event. Environmental information exchange that is not required for taking response measures should be requested through and transmitted between the Co-chairpersons of the SOFA Environmental Subcommittee.
- d. **Followon actions:** As a general rule, information shared between the US and ROK through the SOFA Environmental Subcommittee procedures outlined above will be the primary process used to manage events and responses thereto. Requests for joint

access, survey, and monitoring may be initiated by either the US or ROK Co-Chairperson of the SOFA Environmental Subcommittee. The following procedures will be followed in order to request and approve joint access, surveying and monitoring:

- (1) The requesting component chairperson will present a written request that states a clear and specific purpose and scope for the joint access, survey, and monitoring, along with a proposed itinerary, to the hosting component chairperson.
 - (2) The requesting component chairperson will also present a list of desired attendees to the hosting component chairperson. The list may include national and local government officials, and others, all of whom will be subject to the approval of the hosting component chairperson.
 - (3) The two Co-Chairpersons of the SOFA Environmental Subcommittee will approve the joint access, survey, and monitoring by mutual agreement.
 - (4) If so approved, the hosting component chairperson will publish an approval document, which will state the clear and specific scope and purpose of the joint access, survey and monitoring, as well as a list of the joint attendees.
 - (5) The working group will recommend and report on remedial actions and follow-up measures to the Environmental Subcommittee.
 - (6) Either or both of the working group chairmen may report to the SOFA Environmental subcommittee on the results of remedial action, which may be further reported to the Joint Committee if necessary for closure of the action or decision on future actions.
- e. Notification to the media: All information communicated to the media should be jointly approved by the Co-Chairpersons of the SOFA Environmental Subcommittee prior to release. When not jointly approved, the USFK or ROK Co-Chairperson, as applicable, will make every effort to provide in advance to his counterpart a copy or summary of the information to be communicated to the media.
- f. Plan Requirement. All USFK installations will prepare, maintain and implement a Spill Prevention and Response Plan which provides for the prevention, control and reporting of all spills of POL and hazardous substances. The plan will provide measures to prevent, and to the maximum extent practicable, to remove a worst-case discharge from the facility. The plan will be updated at least every five years or when there are significant changes to operations. The plan should be kept in a location easily accessible to the FIC and FRT.
- g. Spill Prevention. The following are spill prevention criteria, that as a minimum, will be included in the prevention section of the plan.
- (1) Name, title, responsibilities, duties and telephone number of the designated FIC and an alternate.
 - (2) General information on the installation including name, type or function, location and address, charts of drainage patterns, drains, catch basins, oil water separators, wash racks, sewer lines, designated water protection areas, maps showing locations of facilities described in paragraph 18-3.g.(3), critical water resources, land uses and possible migration pathways.
 - (3) An inventory of storage, handling and transfer sites that could possibly produce a significant spill. For each listing, using maps as appropriate include a prediction of the direction and rate of flow, and total quantity of POL or hazardous substance that might be spilled as a result of a major failure.
 - (4) An inventory of all POL and hazardous substances at storage, handling and transfer facilities described in paragraph 18-3.g.(3),.
 - (5) Arrangements for emergency services. The plan will describe arrangements with installation and/or local police departments, fire departments, hospitals, contractors and emergency response teams to coordinate emergency services.

- (6) Means to contact emergency services. The plan will include a telephone number or other means to contact the appropriate emergency services provider (e.g. installation fire department) on a 24-hour basis.
 - (7) A detailed description of the facility's prevention, control and countermeasures, including structures and equipment for diversion and containment of spills, for each facility listed in the inventory. Measures should permit, as far as practical, reclamation of spilled substances. Chapters governing hazardous materials, hazardous wastes, POL, underground storage tanks, pesticides and PCBs provide specific criteria for containment structure requirements.
 - (8) A list of all emergency equipment (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external) and decontamination equipment) at each site listed in the inventory where this equipment is required. This list will be kept up-to-date. In addition, the plan will include the location and a physical description of each item on the list, and a brief outline of its capabilities.
 - (9) An evacuation plan for each site listed in the inventory, where there is a possibility that evacuation would be necessary. This plan will describe signal(s) to be used to begin evacuation, evacuation routes, alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires), and a designated meeting place.
 - (10) A description of deficiencies in spill prevention and control measures at each facility listed in the inventory, to include corrective measures required, procedures to be followed to correct listed deficiencies and any interim control measures in place. Corrective actions must be implemented within 24 months of the date of plan preparation or revision.
 - (11) Written procedures for:
 - (a) Operations to preclude spills of POL and hazardous substances;
 - (b) Inspections; and
 - (c) Record keeping requirements.
 - (12) Site-specific procedures should be maintained at each site on the facility where significant spills could occur.
- h.* Spill Control. The following are spill control criteria that, as a minimum, will be included in the control section of the plan. The spill control section of the plan (which may be considered a contingency plan) will identify resources for cleaning up spills at installations and activities, and to provide assistance to other agencies when requested.
- (1) Provisions specifying the responsibilities, duties, procedures and resources to be used to contain and clean up spills.
 - (2) A description of immediate response actions that should be taken when a spill is first discovered. This should be installed at all storage, handling, and disposal facilities in a one-page format in English and Korean. The posting shall state the following:
 - (a) Immediately take action.
 - 1. Evaluate health/safety risk.
 - 2. Extinguish flames.
 - 3. Attempt to stop the spill.
 - (b) Immediately call help.
 - 1. Fire Department.
 - 2. Provide your name, telephone, location, incident, risk, and actions.
 - (c) Continue spill response.
 - 1. Secure site.

2. Apply absorbents and/or containment.
3. Remove spill material and/or waste.
- (3) The responsibilities, composition, and training requirements of the FRT.
- (4) Procedures for FRT alert and response to include provisions for:
 - (a) Access to a reliable communications system for timely notification of a POL spill or hazardous substance spill.
 - (b) Public affairs involvement.
- (5) A current roster of the persons, and alternates, who must receive notice of a POL or hazardous substance spill including a DESC representative if applicable. The roster will include name, organization mailing address, and work and home telephone number. Without compromising security, the plan will include provisions for the notification of the emergency coordinator after normal working hours.
- (6) The plan will provide for the notification of the FIC, installation commander.
- (7) Assignment of responsibilities for making the necessary notifications including notification to the emergency services providers.
- (8) Surveillance procedures for early detection of POL and hazardous substance spills.
- (9) A prioritized list of various critical water and natural resources that will be protected in the event of a spill.
- (10) Other resources addressed in prearranged agreements including mutual aid agreement with ROK Fire Departments that are available to the installation to clean up or reclaim a large spill due to USFK activities, if such spill exceeds the response capability of the installation.
- (11) Cleanup methods, including procedures and techniques used to identify, contain, disperse, reclaim and remove POL and hazardous substances used in bulk quantity on the installation.
- (12) Procedures for the proper reuse and disposal of recovered substances, contaminated POL and absorbent materials, and procedures to be accomplished prior to resumption of operations.
- (13) A description of general health, safety and fire prevention precautions for spill cleanup actions.
- (14) A public affairs section that describes the procedures, responsibilities, and methods for releasing information in the event of a spill.
- (15) An annual exercise of installation spill response actions will be conducted at one of the following sites: fuel dispensing station, POL storage area, heating oil transfer site, or above ground tank without secondary containment.
- i. **Reporting.** The following are reporting criteria that, as minimum will be included in the reporting section of the plan.
 - (1) Record keeping when emergency procedures are invoked.
 - (2) Any significant spill will be reported to the FIC immediately. Immediate actions will be taken to eliminate the source and contain the spill.
 - (3) The FIC will immediately notify the appropriate In-Theater Component Commander and/or Defense Agency and the USFK ACofS, Engineer, and submit a follow-up written report when:
 - (a) The spill occurs outside a USFK installation.
 - (b) The spill occurs inside a USFK installation and cannot be contained within the installation boundaries.
 - (c) The spill occurs inside a USFK installation and cannot be contained within any required berm or secondary containment (i.e. any quantity outside of secondary containment).

- (d) A surface or groundwater resource has been polluted or is under threat of being polluted.
- (e) The spill involves POL or liquid or semi-liquid hazardous material, hazardous waste (HW), or hazardous substance, in excess of 400 liters (110 gallons).
- (f) The spill involves other solid hazardous material, in excess of 225Kg (500 pounds).
- (g) The spill involves combinations of POL and liquid, semi-liquid, and solid hazardous materials, HW, or hazardous substance, in excess of 340Kg (750 pounds).
- (h) The spill involves hazardous material/waste that is equal to or greater than the Reportable Quantity (RQ) listed in Appendix B, Table B-3.
- (i) The FIC has determined that the spill is significant.
- (4) In the event a significant spill of POL or hazardous substance occurs inside a USFK installation and cannot be contained within the installation boundaries, threatens a ROK drinking water resource, or the spill occurs outside of a USFK installation:
 - (a) The unit that was the source of the release will take immediate action to safely stop the source of the spill/leakage, contain the spill/leakage, and conduct initial response and cleanup within the limits of their capabilities.
 - (b) The organization that causes the spill will immediately notify the area staff duty officer, who in turn will contact the facility/base engineer, USFK Engineer, and USFK Public Affairs Officer or Command Center (CC)-Seoul (after working hours).
 - (c) The facility/base engineering work force will serve as the primary responders. USFK Engineer will advise and assist the local installation commander regarding informing local government officials on the incident.
 - (d) In addition to reporting requirements above, the installation commander or his/her representative shall notify ROK authorities immediately.
 - (e) The USFK response to off-post spills/damages will be limited to notification actions, spill control, collection of standing product, and fire prevention.
 - (f) Under the provisions of Article XXIII of the U.S.-ROK SOFA, claims by local national individuals or organizations for damages arising from off-installation spills will be handled through the established claims procedures. Questions from USFK personnel regarding submission of claims should be directed to the US Army Forces Claims Service. Questions from ROK personnel should be referred to the local District Compensation Committee.
- (5) The organization responsible for causing a spill will be responsible for reimbursement of costs, if any, associated with spill response and associated waste disposal.
- j. Installations will provide necessary training and spill response drills to ensure the effectiveness of personnel and equipment.
- k. After completion of the initial response, any remaining free product and/or obviously contaminated soil will be appropriately removed and managed. Further action will be governed by DoDI 4715.8, " Environmental Remediation for DoD Activities Overseas."

Chapter 19 UNDERGROUND STORAGE TANKS

19-1. SCOPE.

This chapter contains criteria to control and abate pollution resulting from POL products and hazardous materials stored in USTs. Standards for USTs containing HW are covered in Chapter 6.

19-2. DEFINITIONS.

- a. **Hazardous material.** Any material defined as a hazardous material in Chapter 5. The term does not include:
 - (1) Petroleum, including crude POL or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous material above.
 - (2) Natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).
- b. **Hazardous material UST.** A UST that contains a hazardous material (but not including hazardous waste as defined in Chapter 6 or any mixture of such hazardous materials, and petroleum, and which is not a petroleum UST.
- c. **New UST.** Any UST installed on or after 1 October 1994.
- d. **Petroleum Storage Facility that can cause soil contamination.** An installation that has fuel storage tanks with total capacity, excluding portable storage, of greater than or equal to 20,000 liters (5,280 gallons).
- e. **POL.** Refined petroleum, oils and lubricants.
- f. **Tank Tightness Testing.** A test that must be capable of detecting a 0.38 liter (0.1 gallon) per hour leak from any portion of the tank that routinely contains product while accounting for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and the location of water table.
- g. **Underground storage tank (UST).** Any tank including underground piping connected thereto, larger than 416 liters (110 gallons), that is used to contain POL products or hazardous materials and the volume of which, including the volume of connected pipes, is 10 percent or more beneath the surface of the ground, but does not include--
 - (1) Tanks containing heating oil used for consumption on the premises where it is stored;
 - (2) Septic tanks;
 - (3) Stormwater or wastewater collection systems;
 - (4) Flow through process tanks;
 - (5) Surface impoundments, pits, ponds or lagoons;
 - (6) Field constructed tanks;
 - (7) Hydrant fueling systems.
 - (8) Storage tanks located in an accessible underground area (such as a basement or vault) if the storage tank is situated upon or above the surface of the floor.
 - (9) UST containing de minimis concentrations of regulated substances, except where paragraph 19-3(c)3 is applicable.
 - (10) Emergency spill or overflow containment UST systems that are expeditiously emptied after use.
- h. **U.S. industry standards.** Those standards adopted by independent professional organizations, including, but not limited to, American Society for Testing and Materials, American National Standards Institute, American Petroleum Institute, National

Association of Corrosion Engineers, National Fire Protection Association and Underwriters Laboratories.

19-3. CRITERIA.

- a. All installations will maintain a UST inventory, as part of the inventory of storage tanks required by para 9-3.a.
- b. If an installation has fuel storage tanks with total capacity, excluding portable storage, of greater than or equal to 20,000 liters (5,280 gallons), the installation shall be considered as a Petroleum Storage Facility that can cause soil contamination. The capacity of heating fuel tanks will be counted in the total capacity of an installation. All underground fuel tanks, including heating fuel tanks, in an installation considered to be a Petroleum Storage Facility must meet criteria in paragraphs 19-3.c. and 19-3.d by 30 Sep 2008. ~~New~~ POL USTs. All new petroleum UST systems will be properly installed, protected from corrosion, provided with spill/overflow prevention and incorporate leak detection as described below.
 - (1) Corrosion protection. New tanks and piping must be provided with corrosion protection unless constructed of fiberglass or other non-corrodible material. The corrosion protection system must be certified by competent authority.
 - (2) Spill/overflow protection. New USTs will be provided with spill and overflow prevention equipment, except where transfers are made in the amounts of 95 liters (25 gallons) or less. Where spill and overflow protection are required, a spill catchment basin must be installed around the fill pipe. Overflow prevention will be provided by one of the following methods:
 - (a) Automatic shut-off device (set at 95% of tank capacity).
 - (b) High level alarm (set at 90% of tank capacity).
 - (3) Leak detection. Leak detection systems must be capable of detecting a 0.38 liter (0.1 gallon) per hour leak rate or a release of 568 liters (150 gallons) (or one percent of tank volume, whichever is less) within 30 days with a probability of detection of 0.95 and a probability of false alarm of not more than 0.05.
 - (4) New USTs will use one of the following leak detection methods:
 - (a) Automatic tank gauging.
 - (b) Vapor monitoring.
 - (c) Groundwater monitoring.
 - (d) Interstitial monitoring.
 - (5) All new pressurized UST piping must be equipped with automatic line leak detectors and utilize either an annual tightness test or monthly monitoring.
 - (6) Suction piping will either have a line tightness test conducted every three years or use monthly monitoring.
 - (7) Underground fuel piping connecting to fuel storage tanks will be double-walled piping meeting US industry standards.
 - (8) POL tank construction. Whenever feasible, POL USTs will be replaced with above ground tanks.
- c. Existing POL USTs. Existing POL USTs and piping will be properly closed if not needed or be upgraded or replaced to meet new UST system requirements as indicated in subparagraph 19-3c, by 1 October 2004.
 - (1) Existing UST and piping not incorporating leak detection will be tightness tested annually IAW recognized U.S. industry standards and inventoried monthly to determine system tightness.
 - (2) All existing leaking UST will be immediately emptied and removed from service. If the UST is still required, it will be repaired or replaced. If the UST is no longer required it will be removed from the ground. When a leaking UST is removed,

exposed free product and/or obviously contaminated soil in the immediate vicinity of the tank will be appropriately removed and managed. Additional action will be governed by DoDI 4715.8, "Management of Environmental Compliance at Overseas Installations." Under extenuating circumstances (e.g., where the UST is located under a building), a waiver may be requested for the UST to be left in place after being cleaned and filled with an inert substance.

- (3) When a UST has not been used for one year, all of the product and sludges must be removed. If there is a projected future use for the tank, the tank and its lines must be cleaned and filled with an inert substance. If there is no projected use for the tank, it will be removed. Tank wastes must be tested in accordance with subparagraph 9-3e.
- d. New hazardous material USTs.
 - (1) All new hazardous material USTs and piping must meet the same design and construction standards as required for new petroleum USTs and piping, and in addition must be provided with secondary containment for both tank and piping. Secondary containment can be met by using double-walled tanks and piping, liners, or vaults.
 - (2) Leak detection. The interstitial space (space between the primary and secondary containment) for tanks and piping must be monitored monthly for liquids or vapors.
- e. Existing hazardous material USTs.
 - (1) Existing hazardous material tanks and piping were to have been upgraded or replaced to meet the new hazardous material tanks and piping requirements indicated in subparagraph 19-3f, by 1 January 1999.
 - (2) Existing tanks and piping not incorporating leak detection will be tightness tested annually and inventoried monthly.

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APPENDIX A

REFERENCES

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APPENDIX B

CHARACTERISTICS OF HAZARDOUS WASTES AND LISTS OF HAZARDOUS WASTES AND HAZARDOUS MATERIALS

B-1 CHARACTERISTICS OF HAZARDOUS WASTE.

a. General.

- (1) A solid waste is a discarded material that may be solid, semi-solid, liquid, or contained gas.
- (2) A solid waste is a hazardous waste if it exhibits a characteristic of a hazardous waste or is listed as a hazardous waste in this Appendix.
- (3) Each hazardous waste is identified by a USEPA Hazardous Waste Number (HW#). A characteristic waste is assigned every USEPA HW# that is applicable. The HW# must be used in complying with the notification, recordkeeping, and reporting requirements.

b. Characteristic of Ignitability.

- (1) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:
 - (a) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume and has a flash point less than 60°C (140°F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80 or a Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78 or as determined by an equivalent test method;
 - (b) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard;
 - (c) It is an ignitable compressed gas as and as determined by appropriate test methods or USEPA; or
 - (d) It is an oxidizer.
- (2) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001.

c. Characteristic of Corrosivity.

- (1) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:
 - (a) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter; or
 - (b) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55°C (130°F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM-01-69 as standardized in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods."
- (2) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

d. Characteristic of Reactivity.

- (1) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:
 - (a) It is normally unstable and readily undergoes violent change without detonating;
 - (b) It reacts violently with water;

- (c) It forms potentially explosive mixtures with water;
 - (d) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
 - (e) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
 - (f) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement;
 - (g) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure; or
 - (h) It is a forbidden explosive.
- (2) A solid waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003.
- e. Toxicity Characteristic.
 - (1) A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, the extract from a representative sample of the waste contains any of the contaminants listed in Appendix B, Tables B.1 or B.2, at the concentration equal to or greater than the respective value given in that table. Where the waste contains less than 0.5 percent filterable solids, the waste itself is considered to be the extract for the purpose of this section.
 - (2) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in table B.1 or Section B.2 that corresponds to the toxic contaminant causing it to be hazardous.

B-2 Lists of Hazardous Wastes.

- a. General.
 - (1) A solid waste is a hazardous waste if it is listed in this section.
 - (2) The basis for listing the classes or types of wastes listed employed one or more of the following Hazard Codes:

(a) Ignitable Waste	(I)
(b) Corrosive Waste	(C)
(c) Reactive Waste	(R)
(d) Toxicity Characteristic Waste	(E)
(e) Acute Hazardous Waste	(H)
(f) Toxic Waste	(T)
 - (3) Each hazardous waste listed in this section (B-2) is assigned a USEPA Hazardous Waste Number that precedes the name of the waste. This number must be used in complying with the notification, recordkeeping and reporting requirements of these alternate standards.
- b. Hazardous Wastes from Non-Specific Sources. The solid wastes in table B.3 are listed hazardous wastes from non-specific sources. These hazardous wastes are designated with an "F."
- c. The solid wastes listed in table B.4, annotated "K" as the first character in the USEPA Number column, are listed hazardous wastes from specific sources.
- d. Discarded Commercial Chemical Products, Off-Specification Species, Container Residues, and Spill Residues Thereof.
 - (1) The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded when they are mixed with waste oil or used oil or other material and applied to the land for dust suppression or road treatment, when they are otherwise applied to the land in lieu of their original intended use or when they are contained in products that are applied to the land in lieu of their

original intended use, or when, in lieu of their original intended use, they are produced for use as (or as a component of) a fuel, distributed for use as a fuel, or burned as a fuel.

- (a) Any commercial chemical product, or manufacturing chemical intermediate having the generic name listed in table B.4, annotated "P" or "U" as the first character in the USEPA waste number.
- (b) Any off-specification commercial chemical product or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in table B.4, annotated "P" or "U" as the first character in the USEPA waste number.
- (c) Any residue remaining in a container or in an inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate having the generic name listed in table B.4, annotated "P" or "U" as the first character in the USEPA waste number, unless the container is empty. Comment: Unless the residue is being beneficially used or reused, or legitimately recycled or reclaimed; or being accumulated, stored, transported or treated prior to such use, re-use, recycling or reclamation, the residue to be intended for discard, and thus, a hazardous waste. An example of a legitimate re-use of the residue would be where the residue remains in the container and the container is used to hold the same commercial chemical product or manufacturing chemical intermediate it previously held. An example of the discard of the residue would be where the drum is sent to a drum reconditioner who reconditions the drum but discards the residue.]
- (d) Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill into or on any land or water of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in Table B.4, annotated "P" or "U" as the first character in the USEPA waste number, or any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any off-specification chemical product and manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in table B.4, annotated "P" or "U" as the first character in the USEPA waste number of this section.
[Comment: The phrase "commercial chemical product or manufacturing chemical intermediate having the generic name listed in ..." refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in table B.4, annotated "P" or "U" as the first character in the USEPA waste number. Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in table B.4, annotated "P" or "U" as the first character in the USEPA waste number, such waste will be listed in section B-2. b. (Hazardous Wastes from Non-Specific Sources), or will be identified as a hazardous waste by the characteristics set forth in section B-1.]
- (e) The commercial chemical products, manufacturing chemical intermediates or off-specification commercial chemical products or manufacturing chemical intermediates referred to in table B.4, subparagraph annotated "P" as the first character in the USEPA waste number are hereby identified as acute hazardous wastes (H). {Comment: For the convenience of the regulated

community the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), and R (Reactivity). Absence of a letter indicates that the compound only is listed for acute toxicity.] These wastes and their corresponding USEPA Hazardous Waste Numbers are listed in Table B.4, annotated "P" as the first character in the USEPA waste number.

- (f) The commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products referred to in table B.4, subparagraphs (a) through (d) of this section, are hereby identified as toxic wastes (T), unless otherwise designated. [Comment: For the convenience of the regulated community, the primary hazardous properties of these materials have been indicated by the letter T (Toxicity), R (Reactivity), I (Ignitability), and C (Corrosivity). Absence of a letter indicates that the compound is only listed for toxicity.]

B-3 Designated Waste.

- a. Waste generated from specific facilities
 - (1) Waste synthetic polymer.
 - (a) Waste synthetic resin that is generated from the manufacture process of synthetic resin.
 - (b) Waste synthetic rubber that is generated from the manufacture process of synthetic rubber.
 - (2) Industrial sludge with the water content of less than 95% or solid content of more than 5%, which contain substance in B-3.k.
 - (3) Pesticide manufacture process waste
- b. Corrosive waste
 - (1) Waste acid with pH of 2.0 or less
 - (2) Waste alkali with pH 12.5 or more
- c. Wastes containing hazardous material that contain substances in B-3.k.
 - (1) Slag
 - (2) Particulate matters from air pollution prevention facility
 - (3) Waste casting sand and waste sand from sand-blast.
 - (4) Waste fire-resistant material and pieces of pottery before glaze coating.
 - (5) Incineration ash
 - (6) Waste treated by stabilization or solidification
 - (7) Waste catalyst
 - (8) Waste adsorbent and waste absorbent
- d. Waste organic solvents
 - (1) Halogenated solvent
 - (a) Chlorobenzene
 - (b) Dichlorobenzene
 - (c) Dichlorodifluoromethane
 - (d) Dichloroethane
 - (e) Dichloromethane
 - (f) Dichlorophenol
 - (g) Monochlorophenol
 - (h) Tetrachloroethylene
 - (i) Tetrachloromethane
 - (j) Trichloroethane
 - (k) Trichloroethylene
 - (l) Trichlorofluoromethane
 - (m) Trichloromethane

- (n) Trichlorophenol
 - (o) Trichlorotrifluoroethane
- (2) Other waste organic solvents
- e. Waste paint and waste lacquer including the mixture of paint, lacquer and organic solvent generated from the paint or lacquer manufacturing process; waste recycling and paint removal facilities with 5m³ or more of volume or with 3 horsepower or more of power.
- f. Waste oil with oil content of 5% or more. This does not apply to PCB- containing wastes, and waste edible oil.
- g. Waste asbestos
 - (1) Waste asbestos generated from the manufacture or process of asbestos or from the removal of structure and building.
 - (2) Residue generated from the polishing, cutting, and processing of solidified asbestos like slate and particulate matters (PM) collected from the PM collectors from facilities for polishing, cutting, and processing of asbestos containing material.
 - (3) Vinyl sheets, dust-proof masks, overalls used during the work of asbestos removal
- h. PCB-containing waste
 - (1) Liquid waste with the PCB content of more than 2mg/l
 - (2) Waste other than liquid waste with the PCB content of more than 0.003mg per 1 liter of effluent
- i. Hazardous material, which becomes waste: Table 5-5 and 5-6 list hazardous materials of concern.
- j. Infectious wastes are designated hazardous wastes and Chapter 8 (Medical Waste Management) covers infectious wastes.
- k. Hazardous substance contained in designated waste. ?
 - (1) Lead or its compounds (lead contents with 3 mg/L or more by standard leaching procedure).
 - (2) Copper or its compounds (copper contents with 3 mg/L or more in the extraction liquid).
 - (3) Arsenic or its compounds (arsenic contents with 1.5 mg/L or more in the extraction liquid).
 - (4) Mercury or its compounds (mercury contents with 0.005 mg/L or more in the extraction liquid).
 - (5) Cadmium or its compounds (cadmium contents with 0.3 mg/L or more in the extraction liquid).
 - (6) Hexavalent chromium or its compounds (hexavalent chromium contents with 1.5 mg/L or more in the extraction liquid).
 - (7) Cyanide compounds (cyanide contents with 1 mg/L or more in the extraction liquid).
 - (8) Organic phosphorus compounds (organic phosphorus contents with 1 mg/L or more in the extraction liquid).
 - (9) Tetrachloroethylene (tetrachloroethylene contents with 0.1 mg/L or more in the extraction liquid).
 - (10) Trichloroethylene (trichloroethylene contents with 0.3 mg/L or more in the extraction liquid).

Table B-1 MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC			
USEPA HW No. ¹	Contaminant	CAS No. ²	Regulatory Level (mg/L)
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0
D006	Cadmium	7440-43-2	1.0
D007	Chromium	7440-47-3	5.0
D016	2,4-D	94-75-7	10.0
D012	Endrin	72-20-8	0.02
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D015	Toxaphene	8001-35-2	0.5
D017	2,4,5-TP (Silvex)	93-72-1	1.0

¹ USEPA Hazardous waste number.

² Chemical Abstracts Service number.

Table B-2 MAXIMUM CONCENTRATION OF CONTAMINANTS FOR NON-WASTEWATER			
USEPA HW No. ¹	Contaminant	CAS No. ²	Regulatory Level (mg/kg)
D018	Benzene	71-43-2	0.5
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D023	o-Cresol	95-48-7	200.0
D024	m-Cresol	108-39-4	200.0
D025	p-Cresol	106-44-5	200.0
D026	Cresol		200.0
D027	1,4-Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	0.13
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D035	Methyl Ethyl Ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400.0
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D043	Vinyl Chloride	75-01-4	0.2

¹ USEPA Hazardous waste number.

² Chemical Abstracts Service number.

Table B-3 LISTED HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES		
USEPA Waste No. ¹	Hazardous Waste	Hazard Code
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I) ²

Table B-3 (Cont) LISTED HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES		
USEPA Waste No. ¹	Hazardous Waste	Hazard Code
F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I,T)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	(T)
F007	Spent cyanide plating bath solutions from electroplating operations.	(R,T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R,T)

Table B-3 (Cont) LISTED HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES		
USEPA Waste No. 1	Hazardous Waste	Hazard Code
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R,T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	(R,T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R,T)
F012	Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusion conversion coating process.	(T)
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5- trichlorophenol).	(H)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	(H)

Table B-3 (Cont) LISTED HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES		
USEPA Waste No. 1	Hazardous Waste	Hazard Code
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.	(H)
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5- trichlorophenol).	(H)
F024	Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in Sec26131 or Sec26132).	(T)
F025	Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	(T)

Table B-3 (Cont) LISTED HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES		
USEPA Waste No. 1	Hazardous Waste	Hazard Code
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	(H)
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols (This listing does not include formulations containing Hexachlorophene synthesized from prepurified 2,4,5- trichlorophenol as the sole component).	(H)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Numbers F020, F021, F022, F023, F026, and F027.	(T)
F032	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially cross- contaminated wastes that have had the F032 waste code deleted in accordance with Sec 26135 of this chapter or potentially cross- contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)

Table B-3 (Cont) LISTED HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES		
USEPA Waste No. 1	Hazardous Waste	Hazard Code
F034	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
F035	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
F037	Petroleum refinery primary oil/water/solids separation sludge—Any sludge generated from the gravitational separation of oil/water/ solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/ solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in Sec 26131(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.	(T)

Table B-3 (Cont) LISTED HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES		
USEPA Waste No. ¹	Hazardous Waste	Hazard Code
F038	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge—Any sludge and/or float generated from the physical and/or chemical separation of oil/water/ solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in Sec 26131(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.	(T)
F039	Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under subpart D of this part (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other Hazardous Wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028)	(T)

Notes

¹ USEPA Hazardous Waste Number

² (I,T) should be used to specify mixtures containing ignitable and toxic constituents.

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Acenaphthene	83329			100
Acenaphthylene	208968			5,000
Acetaldehyde (I)	75070		U001	1,000
Acetaldehyde, chloro-	107200		P023	1,000
Acetaldehyde, trichloro-	75876		U034	5,000
Acetamide	60355			100
Acetamide, N-(aminothioxomethyl)-	591082		P002	1,000
Acetamide, N-(4-ethoxyphenyl)-	62442		U187	100
Acetamide, 2-fluoro-	640197		P057	100
Acetamide, N-9H-fluoren-2-yl-	53963		U005	1
Acetic acid	64197			5,000
Acetic acid (2,4-dichlorophenoxy)-salts and esters	94757		U240	100
Acetic acid, lead(2+) salt	301042		U144	10
Acetic acid, thallium(1+) salt	563688		U214	1000
Acetic acid, (2,4,5-trichlorophenoxy)	93765		U232	1,000
Acetic acid, ethyl ester (I)	141786		U112	5,000
Acetic acid, fluoro-, sodium salt	62748		P058	10
Acetic anhydride	108247			5,000
Acetone (I)	67641		U002	5,000
Acetone cyanohydrin	75865	1,000	P069	10
Acetone thiosemicarbazide	1752303	1,000/10,000		1
Acetonitrile (I,T)	75058		U003	5,000
Acetophenone	98862		U004	5,000
2-Acetylaminofluorene	53963		U005	1
Acetyl bromide	506967			5,000
Acetyl chloride (C,R,T)	75365		U006	5,000
1-Acetyl-2-thiourea	591082		P002	1
Acrolein	107028	500	P003	1
Acrylamide	79061	1,000/10,000	U007	5,000
Acrylic acid (I)	79107		U008	5,000
Acrylonitrile	107131	10,000	U009	100
Acrylyl chloride	814686	100		1
Adipic acid	124049			5,000
Adiponitrile	111693	1,000		1
Aldicarb	116063	100/10,000	P070	1
Aldrin	309002	500/10,000	P004	1
Allyl alcohol	107186	1,000	P005	100
Allylamine	107119	500		1
Allyl chloride	107051			1,000
Aluminum phosphide (R,T)	20859738	500	P006	100
Aluminum sulfate	10043013			5,000
4-Aminobiphenyl	92671			1
5-(Aminomethyl)-3-isoxazolol	2763964		P007	1,000
Aminopterin	54626	500/10,000		1

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
4-Aminopyridine	504245		P008	1,000
Amiton	78535	500		1
Amiton oxalate	3734972	100/10,000		1
Amitrole	61825		U011	10
Ammonia	7664417	500		100
Ammonium acetate	631618			5,000
Ammonium benzoate	1863634			5,000
Ammonium bicarbonate	1066337			5,000
Ammonium bichromate	7789095			10
Ammonium bifluoride	1341497			100
Ammonium bisulfite	10192300			5,000
Ammonium carbamate	1111780			5,000
Ammonium carbonate	506876			5,000
Ammonium chloride	12125029			5,000
Ammonium chromate	7788989			10
Ammonium citrate, dibasic	3012655			5,000
Ammonium fluoborate	13826830			5,000
Ammonium fluoride	12125018			100
Ammonium hydroxide	1336216			1,000
Ammonium oxalate	6009707 5972736 14258492			5,000
Ammonium picrate (R)	131748		P009	10
Ammonium silicofluoride	16919190			1,000
Ammonium sulfamate	7773060			5,000
Ammonium sulfide	12135761			100
Ammonium sulfite	10196040			5,000
Ammonium tartrate	14307438 3164292			5,000
Ammonium thiocyanate	1762954			5,000
Ammonium vanadate	7803556		P119	1,000
Amphetamine	300629	1,000		1
Amyl acetate	628637			5,000
Iso-Amyl acetate	123922			
Sec-Amyl acetate	626380			
Tert-Amyl acetate	625161			
Aniline (I,T)	62533	1,000	U012	5,000
Aniline, 2,4,6- trimethyl	88051	500		1
o-Anisidine	90040			100
Anthracene	120127			5,000
Antimony++	7440360			5,000
Antimony pentachloride	7647189			1,000
Antimony pentafluoride	7783702	500		1
Antimony potassium tartrate	28300745			100
Antimony tribromide	7789619			1,000

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Antimony trichloride	10025919			1,000
Antimony trifluoride	7783564			1,000
Antimony trioxide	1309644			1,000
Antimycin A	1397940	1,000/10,000		1
ANTU (Thiourea 1-Naphthalenyl)	86884	500/10,000		100
Argentate(1-), bis(cyano-C)-, potassium	506616		P099	1
Aroclor 1016	12674112			1
Aroclor 1221	11104282			1
Aroclor 1232	11141165			1
Aroclor 1242	53469219			1
Aroclor 1248	12672296			1
Aroclor 1254	11097691			1
Aroclor 1260	11096825			1
Aroclors	1336363			1
Arsenic++	7440382			1
Arsenic acid H ₃ AsO ₄	1327522 7778394		P010	1
Arsenic disulfide	1303328			1
Arsenic oxide As ₂ O ₃	1327533		P012	1
Arsenic oxide As ₂ O ₅	1303282		P011	1
Arsenic pentoxide	1303282	100/10,000	P011	1
Arsenic trichloride	7784341			1
Arsenic trioxide	1327533		P012	1
Arsenic trisulfide	1303339			1
Arsenous oxide	1327533	100/10,000	P012	1
Arsenous trichloride	7784341	500		5,000
Arsine	7784421	100		1
Arsine, diethyl-	692422		P038	1
Arsinic acid, dimethyl-	75605		U136	1
Arsorous dichloride, phenyl-	696286		P036	1
Asbestos+++	1332214			1
Auramine	492808		U014	100
Azaserine	115026		U015	1
Aziridine	151564		P054	1
Azindine, 2-methyl-	75558		P067	1
Azirino[2',3',3,4]pyrrolo[1,2-a]indole-4, 7-dione,6-amino-8-[[aminocarbonyloxy)methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1a-alpha, 8-beta, 8a-alpha, 8b-alpha)]-	50077		U010	10
Azinphos-ethyl	2642719	100/10,000		100
Azinphos-methyl	86500	10/10,000		1
Barium cyanide	542621		P013	10
Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	56495		U157	10

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Benz[c]acridine	225514		U016	100
Benzal chloride	98873	500	U017	5,000
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	23950585		U192	5,000
Benz[a]anthracene	56553		U018	10
1,2-Benzanthracene	56553		U018	10
Benz[a]anthracene, 7,12-dimethyl-	57976		U094	1
Benzenamine (l,T)	62533		U012	5,000
Benzenamine, 3-(Trifluoromethyl)	98168	500		1
Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl-	492808		U014	100
Benzenamine, 4-chloro-	106478		P024	1,000
Benzenamine, 4-chloro-2-methyl-, hydrochloride	3165933		U049	100
Benzenamine, N,N-dimethyl-4-(phenylazo-)	60117		U093	10
Benzenamine, 2-methyl-	95534		U328	100
Benzenamine, 4-methyl-	106490		U353	100
Benzenamine, 4,4'-methylenebis(2-chloro-	101144		U158	10
Benzenamine, 2-methyl-, hydrochloride	636215		U222	100
Benzenamine, 2-methyl-5-nitro-	99558		U181	100
Benzenamine, 4-nitro-	100016		P077	5,000
Benzene (l,T)	71432		U109	10
Benzene, 1-(Chloromethyl)-4-Nitro-	100141	500/10,000		1
Benzeneacetic acid, 4-chloro-alpha- (4-chlorophenyl)-alpha-hydroxy-, ethyl ester	510156		U038	10
Benzene, 1-bromo-4-phenoxy-	101553		U030	100
Benzeneearsonic Acid	98055	10/10,000		1
Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	305033		U035	10
Benzene, choro-	108907		U037	100
Benzene, chloromethyl-	100447		P028	100
Benzenediamin, ar-methyl-	25376458 95807 496720 823405		U221	10
1,2-Benzenedicarboxylic acid, dioctyl ester	117840		U107	5,000
1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)]-ester	117817		U028	100
1,2-Benzenedicarboxylic acid, dibutyl ester	84742		U069	10
1,2-Benzenedicarboxylic acid, diethyl ester	84662		U088	1,000

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
1,2-Benzenedicarboxylic acid, dimethyl ester	131113		U102	5,000
Benzene, 1,2-dichloro-	95501		U070	100
Benzene, 1,3-dichloro-	541731		U071	100
Benzene, 1,4-dichloro-	106467		U072	100
Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	72548		U060	1
Benzene, dichloromethyl-	98873		U017	5,000
Benzene, 1,3-diisocyanotomethyl- (R,T)	584849 91087 264716254		U223	100
Benzene, dimethyl (I,T)	1330207		U239	100
m-Benzene, dimethyl	108383			1,000
o-Benzene, dimethyl	95476			1,000
p-Benzene, dimethyl	106423			100
1,3-Benzenediol	108463		U201	5,000
1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]- (R) -	51434		P042	1,000
Benzeneethanamine, alpha, alpha-dimethyl-	122098		P046	5,000
Benzene, hexachloro-	118741		U127	10
Benzene, hexahydro- (I)	110827		U056	1,000
Benzene, hydroxy-	108952		U188	1,000
Benzene, methyl-	108883		U220	1,000
Benzene, 2-methyl-1,3-dinitro-	606202		U106	100
Benzene, 1-methyl-2,4-dinitro-	121142		U105	10
Benzene, 1-methylethyl- (I)	98828		U055	5,000
Benzene, nitro-	98953		U169	1,000
Benzene, pentachloro-	608935		U183	10
Benzene, pentachloronitro-	82688		U185	100
Benzenesulfonic acid chloride (C,R)	98099		U020	100
Benzenesulfonyl chloride	98099		U020	100
Benzene, 1,2,4,5-tetrachloro-	95943		U207	5,000
Benzenethiol	108985		P014	100
Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	50293		U061	1
Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-methoxy-	72435		U247	1
Benzene, (trichloromethyl)-	98077		U023	10
Benzene, 1,3,5-trinitro-	99354		U234	10
Benzidine	92875		U021	1
Benzimidazole, 4,5-Dichloro-2-(Trifluoromethyl)-	3615212	500/10,000		1
1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide	81072		U202	100
Benzo[a]anthracene	56553		U018	10

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Benzo[b]fluoranthene	205992			1
Benzo[k]fluoranthene	207089			5,000
Benzo[j,k]fluorene	206440		U120	100
1,3-Benzodioxole, 5-(1-propenyl)-	120581		U141	100
1,3-Benzodioxole, 5-(2-propenyl)-	94597		U203	100
1,3-Benzodioxole, 5-propyl-	94586		U090	10
Benzoic acid	65850			5,000
Benzonitrile	100470			5,000
Benzo[rs]pentaphene	189559		U064	10
Benzo[ghi]perylene	191242			5,000
2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations greater than 0.3%	81812		P001	100
Benzo[a]pyrene	50328		U022	1
3,4-Benzopyrene	50328		U022	1
p-Benzoquinone	106514		U197	10
Benzotrichloride (C,R,T)	98077	500	U023	10
Benzoyl chloride	98884			1,000
1,2-Benzphenanthrene	218019		U050	100
Benzyl chloride	100447	500	P028	100
Benzyl cyanide	140294	500		1
Beryllium++	7440417		P015	10
Beryllium chloride	7787475			1
Beryllium fluoride	7787497			1
Beryllium nitrate	13597994 7787555			1
alpha-BHC	319846			10
beta-BHC	319857			1
delta-BHC	319868			1
gamma-BHC	58899		U129	1
Bicyclo [2,2,1]Heptane-2-carbonitrile, 5-chloro-6-(((Methylamino)Carbonyl)Oxy)Imino)-,(1s-(1-alpha, 2-beta, 4-alpha, 5-alpha, 6E))-	15271417	500/10,000		1
2,2'-Bioxirane	1464535		U085	10
Biphenyl	92524			100
(1,1'-Biphenyl)-4,4'diamine	92875		U021	1
(1,1'-Biphenyl)-4,4'diamine, 3,3'dichloro-	91941		U073	1
(1,1'-Biphenyl)-4,4'diamine, 3,3'dimethoxy-	119904		U091	10
(1,1'-Biphenyl)-4,4'diamine, 3,3'dimethyl-	119937		U095	10
Bis(chloromethyl) ketone	534076	10/10,000		1
Bis(2-chloroethyl)ether	111444		U025	10
Bis(2-chloroethoxy)methane	111911		U024	1,000

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Bis(2-ethylhexyl)phthalate	117817		U028	100
Bitoscanate	4044659	500/10,000		1
Boron trichloride	10294345	500		1
Boron trifluoride	7637072	500		1
Boron trifluoride compound with methyl ether (1:1)	353424	1,000		1
Bromoacetone	598312		P017	1,000
Bromadiolone	28772567	100/10,000		1
Bromine	7726956	500		1
Bromoform	75252		U225	100
4-Bromophenyl phenyl ether	101553		U030	100
Brucine	357573		P018	100
1,3-Butadiene	106990			10
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87683		U128	1
1-Butanamine, N-butyl-N-nitroso-	924163		U172	10
1-Butanol	71363		U031	5,000
2-Butanone	78933		U159	5,000
2-Butanone peroxide (R,T)	1338234		U160	10
2-Butanone, 3,3-dimethyl-1-(methylthio)-, O[(methylamino)carbonyl] oxime	39196184		P045	100
2-Butenal	123739 4170303		U053	100
2-Butene, 1,4-dichloro- (I,T)	764410		U074	1
2-Butenoic acid, 2-methyl-, 7[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy] methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1-alpha(Z),7(2S*,3R*), 7a-alpha]]-	303344		U143	10
Butyl acetate iso-Butyl acetate sec-Butyl acetate tert-Butyl acetate	123864 110190 105464 540885			5,000
n-Butyl alcohol (I)	71363		U031	5,000
Butylamine iso-Butylamine sec-Butylamine tert-Butylamine	109739 78819 513495 13952846 75649			1,000
Butyl benzyl phthalate	85687			100
n-Butyl phthalate	84742		U069	10
Butyric acid iso-Butyric acid	107926 79312			5,000
Cacodylic acid	75605		U136	1
Cadmium++ (2+)	7440439			10
Cadmium acetate	543908			10
Cadmium bromide	7789426			10

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Cadmium chloride	10108642			10
Cadmium oxide	1306190	100/10,000		1
Cadmium stearate	2223930	1,000/10,000		1
Calcium arsenate	7778441	500/10,000		1
Calcium arsenite	52740166			1
Calcium carbide	75207			10
Calcium chromate	13765190		U032	10
Calcium cyanamide	156627			1,000
Calcium cyanide Ca(CN) ₂	592018		P021	10
Calcium dodecylbenzenesulfonate	26264062			1,000
Calcium hypochlorite	7778543			10
Campechlor	8001352	500/10,000		1
Camphene, octachloro-	8001352		P123	1
Cantharidin	56257	100/10,000		1
Carbachol chloride	51832	500/10,000		1
Caprolactum	105602			5,000
Captan	133062			10
Carbamic acid, ethyl ester	51796		U238	100
Carbamic acid, methylnitroso-, ethyl ester	615532		U178	1
Carbamic acid, Methyl-, 0-(((2,4-Dimethyl-1, 3-Dithiolan-2-yl)Methylene)Amino)-	26419738	100/10,000		1
Carbamic chloride, dimethyl-	79447		U097	1
Carbamodithioic acid, 1,2-ethaneilylbis, salts & esters	111546		U114	5,000
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	2303164		U062	100
Carbaryl	63252			100
Carbofuran	1563662	10/10,000		10
Carbon disulfide	75150	10,000	P022	100
Carbon oxyfluoride (R,T)	353504		U033	1,000
Carbon tetrachloride	56235		U211	10
Carbonic acid, dithallium(1+) salt	6533739		U215	100
Carbonic dichloride	75445		P095	10
Carbonic difluoride	353504		U033	1,000
Carbonochloridic acid, methyl ester	79221		U156	1,000
Carbonyl Sulfide	463581			100
Carbophenothion	786196	500		1
Catechol	120809			100
Chloral	75876		U034	5,000
Chlorambem	133904			100
Chlorambucil	305033		U035	10
Chlordane	57749	1,000	U036	1
Chlordane, alpha & gamma isomers	57749		U036	1
Chlordane, technical	57749		U036	1
Chlorfenvinfos	470906	500		1

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Chlorinated champhene (Campheclor)	8001352			1
Chlorine	7782505	100		10
Chlormephos	24934916	500		1
Chlormequat chloride	999815	100/10,000		1
Chlornaphazine	494031		U026	100
Choroacetaldehyde	107200		P023	1,000
Chloroacetophenone	532274			100
Chloroacetic acid	79118	100/10,000		100
p-Chloroaniline	106478		P024	1,000
Chlorobenzene	108907		U037	100
Chlorobenzilate	510156		U038	10
p-Chloro-m-cresol (4)	59507		U039	5,000
1-Chloro-2,3-epoxypropane	106898		U041	100
Chlorodibromomethane	124481			100
Chloroethane	75003			100
Chloroethanol	107073	500		1
Chloroethyl chlorofomate	627112	1,000		1
2-Chloroethyl vinyl ether	110758		U042	1,000
Chloroform	67663	10,000	U044	10
Chloromethane	74873		U045	100
Chloromethyl ether	542881	100	P016	1
Chloromethyl methyl ether	107302	100	U046	1
beta-Chloronaphthalene	91587		U047	5,000
2-Chloronaphthalene	91587		U047	5,000
Chlorophacinone	3691358	100/10,000		1
o-Chlorophenol (2)	95578		U048	100
4-Chlorophenyl phenyl ether	7005723			5,000
1-(o-Chlorophenyl)thiourea	5344821		P026	100
Chloroprene	126998			100
3-Chloropropionitrile	542767		P027	1,000
Chlorosulfonic acid	7790945			1,000
4-Chloro-o-toluidine, hydrochloride	3165933		U049	100
Chlorpyrifos	2921882			1
Chloroxuron	1982474	500/10,000		1
Chlorthiophos	21923239	500		1
Chromic acetate	1066304			1,000
Chromic acid	11115745 7738945			10
Chromic acid H ₂ CrO ₄ , calcium salt	13765190		U032	10
Chromic chloride (Chromium chloride)	10025737	1/10,000		1
Chromic sulfate	10101538			1,000
Chromium++	7440473			5,000
Chromous chloride	10049055			1,000
Chrysene	218019		U050	100

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Cobalt, ((2,2'-(1,2-ethanediylbis (Nitrilo-methylidyne))Bis(6-fluoro-phenolato))(2-N,N',O,O')-	62207765	100/10,000		1
Cobaltous bromide	7789437			1,000
Cobalt carbonyl	10210681	10/10,000		1
Cobaltous formate	544183			1,000
Cobaltous sulfamate	14017415			1,000
Coke Oven Emissions	NA			1
Colchicine	64868	10/10,000		1
Copper++	7440508			5,000
Copper cyanide	544923		P029	10
Coumaphos	56724	100/10,000		10
Coumatetralyl	5836293	500/10,000		1
Creosote	8001589		U051	1
Cresol(s) (Phenol, Methyl)	1319773	1,000/10,000	U052	100
m-Cresol	108394			100
o-Cresol	95487			100
p-Cresol	106445			100
Cresylic acid	1319773		U052	100
m-Cresylic acid	108394			100
o-Cresylic acid	95487			100
p-Cresylic acid	106445			100
Crimidine	535897	100/10,000		1
Crotonaldehyde	123739	1,000	U053	100
	4170303	1,000		100
Cumene (I)	98828		U055	5,000
Cupric acetate	142712			100
Cupric acetoarsenite	12002038			1
Cupric chloride	7447394			10
Cupric nitrate	3251238			100
Cupric oxalate	5893663			100
Cupric sulfate	7758987			10
Cupric sultate, ammoniated	10380297			100
Cupric tartrate	815827			100
Cyanides (soluble salts and complexes) not otherwise specified	57125		P030	10
Cyanogen	460195		P031	100
Cyanogen bromide	506683	500/10,000	U246	1,000
Cyanogen chloride	506774		P033	10
Cyanogen iodide (Iodine cyanide)	506785	1,000/10,000		1
Cyanophos	2636262	1,000		1
Cyanuric fluoride	675149	100		1
2,5-Cyclohexadiene-1,4-dione	106514		U197	10
Cyclohexane (I)	110827		U056	1,000

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Cyclohexane, 1,2,3,4,5,6-hexachloro, (1-alpha, 2-alpha, 3-beta, 4-alpha, 5-alpha, 6-beta)-	58899		U129	1
Cyclohexanone (I)	108941		U057	5,000
2-Cyclohexanone	131895		P034	100
Cycloheximide	66819	100/10,000		1
Cyclohexylamine	108918	10,000		1
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77474		U130	10
Cyclophosphamide	50180		U058	10
2,4-D Acid	94757		U240	100
2,4-D Ester	94111 94791 94804 1320189 1928387 1928616 1929733 2971382 25168267 53467111			100
2,4-D, salts & esters (2,4-Dichlorophenoxyacetic Acid)	94757		U240	100
Daunomycin	20830813		U059	10
Decarborane(14)	17702419	500/10,000		1
Demeton	8065483	500		1
Demeton-S-Methyl	919868	500		1
DDD, 4,4'DDD	72548		U060	1
DDE, 4,4'DDE	72559			1
DDT, 4,4'DDT	50293		U061	1
DEHP (Diethylhexyl phthalate)	117817		U028	100
Diallate	2303164		U062	100
Dialifor	10311849	100/10,000		1
Diazinon	333415			1
Diazomethane	334883			100
Dibenz[a,h]anthracene	53703		U063	1
1,2:5,6-Dibenzanthracene	53703		U063	1
Dibenzo[a,h]anthracene	53703		U063	1
Dibenzofuran	132649			100
Dibenz[a,i]pyrene	189559		U064	10
1,2-Dibromo-3-chloropropane	96128		U066	1
Dibromoethane	106934		U067	1
Diborane	19287457	100		1
Dibutyl phthalate	84742		U069	10
Di-n-butyl phthalate	84742		U069	10

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Dicamba	1918009			1,000
Dichlobenil	1194656			100
Dichlone	117806			1
Dichlorobenzene	25321226			100
m-Dichlorobenzene (1,3)	541731		U071	100
o-Dichlorobenzene (1,2)	95501		U070	100
p-Dichlorobenzene (1,4)	106467		U072	100
3,3'-Dichlorobenzidine	91941		U073	1
Dichlorobromomethane	75274			5,000
1,4-Dichloro-2-butene (I,T)	764410		U074	1
Dichlorodifluoromethane	75718		U075	5,000
1,1-Dichloroethane	75343		U076	1,000
1,2-Dichloroethane	107062		U077	100
1,1-Dichloroethylene	75354		U078	100
1,2-Dichloroethylene	156605		U079	1,000
Dichloroethyl ether	11444	10,000	U025	10
Dichloroisopropyl ether	108601		U027	1,000
Dichloromethoxy ethane	111911		U024	1,000
Dichloromethyl ether	542881		P016	1
Dichloromethylphenylsilane	149746	1,000		1
2,4-Dichlorophenol	120832		U081	100
2,6-Dichlorophenol	87650		U082	100
Dichlorophenylarsine	696286		P036	1
Dichloropropane	26638197			1,000
1,1-Dichloropropane	78999			
1,3-Dichloropropane	142289			
1,2-Dichloropropane	78875		U083	1,000
Dichloropropane--Dichloropropene (mixture)	8003198			100
Dichloropropene	26952238			100
2,3-Dichloropropene	78886			
1,3-Dichloropropene	542756		U084	100
2,2-Dichloropropionic acid	75990			5,000
Dichlorvos	62737	1,000		10
Dicofol	115322			10
Dicrotophos	141662	100		1
Dieldrin	60571		P037	1
1,2:3,4-Diepoxybutane (I,T)	1464535	500	U085	10
Diethanolamine	111422			100
Diethyl chlorophosphate	814493	500		1
Diethylamine	109897			1,000
Diethylarsine	692422		P038	1
Diethylcarbamazine citrate	1642542	100/10,000		1
1,4-Diethylenedioxide	123911		U108	100

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Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Diethylhexyl phthalate	117817		U028	100
N,N-Diethylaniline	91667			1,000
N,N'-Diethylhydrazine	1615801		U086	10
O,O-Diethyl S-methyl dithiophosphate	3288582		U087	5,000
Diethyl-p-nitrophenyl phosphate	311455		P041	100
Diethyl phthalate	84662		U088	1,000
O,O-Diethyl O-pyrazinyl phosphorothioate	297972		P040	100
Diethylstilbestrol	56531		U089	1
Diethyl sulfate	64675			10
Digitoxin	71636	100/10,000		1
Diglycidyl ether	2238075	1,000		1
Digoxin	20830755	10/10,000		1
Dihydrosafrole	94586		U090	10
Diisopropylfluorophosphate	55914		P043	100
Diisopropylfluorophosphate, 1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1-alpha, 4-alpha, 4a-beta, 5-alpha, 8-alpha, 8a-beta)-	309002		P004	1
1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro, (1-alpha, 4-alpha, 4a-beta, 5a-beta, 8-beta, 8a-beta)-	465736		P060	1
2,7:3,6-Dimethanonaphth[2,3 b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1a-alpha, 2-beta, 2a-alpha, 3-beta, 6-beta, 6a-alpha, 7beta, 7aalpha)-	60571		P037	1
2,7:3,6 Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octa-hydro-, (1a-alpha, 2-beta, 2a-beta, 3-alpha, 6-alpha, 6a-beta, 7-beta, 7a-alpha)-	72208		P051	1
Dimethoate	60515		P044	10
3,3'-Dimethoxybenzidine	119904		U091	10
Dimefox	115264	500		1
Dimethoate	60515	500/10,000		10
Dimethyl Phosphorochloridothioate	2524030	500		1
Dimethyl sulfate	77781	500		100
Dimethylamine (l)	124403		U092	1,000
p-Dimethylaminoazobenzene	60117		U093	10
7,12-Dimethylbenz[a]anthracene	57976		U094	1
3,3'-Dimethylbenzidine	119937		U095	10
alpha,alpha-Dimethylbenzylhydroperoxide(R)	80159		U096	10
Dimethylcarbamoyl chloride	79447		U097	1

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Dimethylformamide	68122			100
Dimethyldichlorosilane	75785	500		1
1,1-Dimethylhydrazine	57147	1,000	U098	10
1,2-Dimethylhydrazine	540738		U099	1
alpha, alpha-Dimethylphenethylamine	122098		P046	5,000
Dimethyl-p-phenylenediamine	99989	10/10,000		1
2,4-Dimethylphenol	105679		U101	100
Dimethyl phthalate	131113		U102	5,000
Dimethyl sulfate	77781		U103	100
Dimetilan	644644	500/10,000		1
Dinitrobenzene (mixed)	25154545			100
m-Dinitrobenzene	99650			
o-Dinitrobenzene	528290			
p-Dinitrobenzene	100254			
4,6-Dinitro-o-cresol and salts	534521	10/10,000	P047	10
Dinitrophenol	25550587			10
2,5-Dinitrophenol	329715			
2,6-Dinitrophenol	573568			
2,4-Dinitrophenol	51285		P048	10
Dinitrotoluene	25321146			10
3,4-Dinitrotoluene	610399			
2,4-Dinitrotoluene	121142		U105	10
2,6-Dinitrotoluene	606202		U106	100
Dinoseb	88857	100/10,000	P020	1,000
Dinoterb	1420071	500/10,000		1
Di-n-octyl phthalate	117840		U107	5,000
1,4-Dioxane	123911		U108	100
Dioxathion	78342	500		1
Diphacinone	82666	10/10,000		1
1,2-Diphenylhydrazine	122667		U109	10
Diphosphoramidate, octamethyl-	152169	100	P085	100
Diphosphoric acid, tetraethyl ester	107493		P111	10
Dipropylamine	142847		U110	5,000
Di-n-propylNitrosamine	621647		U111	10
Diquat	85007 2764729			1,000
Disulfoton	298044	500	P039	1
Dithiazanine iodide	514738	500/10,000		1
Dithiobiuret	541537	100/10,000	P049	100
Diuron	330541			100
Dodecylbenzenesulfonic acid	27176870			1,000
Emetine, Dihydrochloride	316427	1/10,000		1
Endosulfan	115297	10/10,000	P050	1
alpha-Endosulfan	959988			1
beta-Endosulfan	33213659			1

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Endosulfant sulfate	1031078			1
Endothall	145733		P088	1,000
Endothion	2778043	500/10,000		1
Endrin	72208	500/10,000	P051	1
Endrin aldehyde	7421934			1
Endrin & metabolites	72208		P051	1
Epichlorohydrin	106898	1,000	U041	100
Epinephrine	51434		P042	1,000
EPN	2104645	100/10,000		1
1,2-Epoxybutane	106887			100
Ergocalciferol	50146	1,000/10,000		1
Ergotamine tartrate	379793	500/10,000		1
Ethanal	75070		U001	1,000
Ethanamine, N-ethyl-N-nitroso-	55185		U174	1
1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	91805		U155	5,000
Ethane, 1,2-dibromo-	106934		U067	1
Ethane, 1,1-dichloro-	75343		U076	1,000
Ethane, 1,2-dichloro-	107062		U077	100
Ethanedinitrile	460195		P031	100
Ethane, hexachloro-	67721		U131	100
Ethane, 1,1'-[methylenebis(oxy)]bis(2-chloro-	111911		U024	1,000
Ethane, 1,1'-oxybis-	60297		U117	100
Ethane, 1,1'-oxybis(2-chloro-	111444		U025	10
Ethane, pentachloro-	76017		U184	10
Ethanesulfonyl chloride, 2-chloro	1622328	500		1
Ethane, 1,1,1,2-tetrachloro-	630206		U208	100
Ethane, 1,1,2,2-tetrachloro-	79345		U209	100
Ethanethioamide	62555		U218	10
Ethane, 1,1,1-trichloro-	71556		U226	1,000
Ethane, 1,1,2-trichloro-	79005		U227	100
Ethanimidothioic acid, N-[[[(methylamino) carbonyl]oxy]-, methyl ester	16752775		P066	100
Ethanol, 1,2-Dichloro-, acetate	10140871	1,000		1
Ethanol, 2-ethoxy-	110805		U359	1,000
Ethanol, 2,2'-(nitrosoimino)bis-	1116547		U173	1
Ethanone, 1-phenyl-	98862		U004	5,000
Ethene, chloro-	75014		U043	1
Ethene, 2-chloroethoxy-	110758		U042	1,000
Ethene, 1,1-dichloro-	75354		U078	100
Ethene, 1,2-dichloro- (E)	156605		U079	1,000
Ethene, tetrachloro-	127184		U210	100
Ethene, trichloro-	79016		U228	100
Ethion	563122	1,000		10

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Ethoprophos	13194484	1,000		1
Ethyl acetate (l)	141786		U112	5,000
Ethyl acrylate (l)	140885		U113	1,000
Ethylbenzene	100414			1,000
Ethylbis(2-Chloroethyl)amine	538078	500		1
Ethyl carbamate (urethane)	51796		U238	100
Ethyl chloride	75003			100
Ethyl cyanide	107120		P101	10
Ethylenebisdithiocarbamic acid, salts & esters	111546		U114	5,000
Ethylenediamine	107153			5,000
Ethylenediamine-tetraacetic acid (EDTA)	60004			5,000
Ethylene dibromide	106934		U067	1
Ethylene dichloride	107062		U077	100
Ethylene fluorohydrin	371620	10		1
Ethylene glycol	107211			5,000
Ethylene glycol monoethyl ether	110805		U359	1,000
Ethylene oxide (l,T)	75218	1,000	U115	10
Ethylenediamine	107153	10,000		5,000
Ethylenethiourea	96457		U116	10
Ethyleneimine	151564	500	P054	1
Ethyl ether (l)	60297		U117	100
Ethylthiocyanate	542905	10,000		1
Ethylidene dichloride	75343		U076	1,000
Ethyl methacrylate	97632		U118	1,000
Ethyl methanesulfonate	62500		U119	1
Famphur	52857		P097	1,000
Fenamphos	22224926	10/10,000		1
Fenlrothion	122145	500		1
Fensulfothion	115902	500		1
Ferric ammonium citrate	1185575			1,000
Ferric ammonium oxalate	2944674 55488874			1,000
Ferric chloride	7705080			1,000
Ferric fluoride	7783508			100
Ferric nitrate	10421484			1,000
Ferric sulfate	10028225			1,000
Ferrous ammonium sulfate	10045893			1,000
Ferrous chloride	7758943			100
Ferrous sulfate	7720787 7782630			1,000
Fluenetil	4301502	100/10,000		1
Fluoranthene	206440		U120	100
Fluorene	86737			5,000
Fluorine	7782414	500	P056	10

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Fluoroacetamide	640197	100/10,000	P057	100
Fluoroacetic acid	144490	10/10,000		1
Fluoroacetic acid, sodium salt	62786		P058	10
Fluoroacetyl chloride	359068	10		1
Fluorouracil	51218	500/10,000		1
Fonofos	944229	500		1
Formaldehyde	50000	500	U122	100
Formaldehyde cyanohydrin	107164	1,000		1
Formetanate hydrochloride	23422539	500/10,000		1
Formothion	2540821	100		1
Formparanate	17702577	100/10,000		1
Formic acid (C,T)	64186		U123	5,000
Fosthletan	21548323	500		1
Fubendazole	3878191	100/10,000		1
Fulminic acid, mercury(2 ⁻) salt (R,T)	628864		P065	10
Fumaric acid	110178			5,000
Furan (I)	110009	500	U124	100
Furan, tetrahydro- (I)	109999		U213	1,000
2-Furancarboxaldehyde (I)	98011		U125	5,000
2,5-Furandione	108316		U147	5,000
Furfural (I)	98011		U125	5,000
Furfuran (I)	110009		U124	100
Gallium trichloride	13450903	500/10,000		1
Glucopyranose, 2-deoxy-2-(3-methyl-3-nitroso-ureido)-	18883664		U206	1
D-Glucose, 2-deoxy-2-[[[(methyl-nitrosoamino)-carbonyl]amino]-	18883664		U206	1
Glycidylaldehyde	765344		U126	10
Guanidine, N-methyl-N'-nitro-N-nitroso-	70257		U163	10
Guthion	86500			1
Heptachlor	76448		P059	1
Heptachlor epoxide	1024573			1
Hexachlorobenzene	118741		U127	10
Hexachlorobutadiene	87683		U128	1
Hexachlorocyclohexane (gamma isomer)	58899		U129	1
Hexachlorocyclopentadiene	77474	100	U130	10
Hexachloroethane	67721		U131	100
Hexachlorophene	70304		U132	100
Hexachloropropene	1888717		U243	1,000
Hexaethyl tetraphosphate	757584		P062	100
Hexamethylene-1, 6-diisocyanate	822060			100
Hexamethylphosphoramide	680319			1
Hexamethylenediamine, N,N'-Dibutyl	4835114	500		1
Hexane	110543			5,000
Hexone (Methyl isobutyl ketone)	108101		U161	5,000

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Hydrazine (R,T)	302012	1,000	U133	1
Hydrazine, 1,2-diethyl-	1615801		U086	10
Hydrazine, 1,1-dimethyl-	57147		U098	10
Hydrazine, 1,2-dimethyl-	540738		U099	1
Hydrazine, 1,2-diphenyl-	122667		U109	10
Hydrazine, methyl-	60344		P068	10
Hydrazinecarbothioamide	79196		P116	100
Hydrochloric acid	7647010			5,000
Hydrocyanic acid	74908	100	P063	10
Hydrofluoric acid	7664393		U134	100
Hydrogen chloride (gas only)	7647010	500		5,000
Hydrogen cyanide	74908		P063	10
Hydrogen fluoride	7664393	100	U134	100
Hydrogen peroxide (Conc. >52%)	7722841	1,000		1
Hydrogen phosphide	7803512		P096	100
Hydrogen selenide	7783075	10		1
Hydrogen sulfide	7783064	500	U135	100
Hydroperoxide, 1-methyl-1-phenylethyl-	80159		U096	10
Hydroquinone	123319	500/10,000		100
2-Imidazolidinethione	96457		U116	10
Indeno(1,2,3-cd)pyrene	193395		U137	100
Iodomethane	74884		U138	100
Iron, Pentacarbonyl-	13463406	100		1
Isobenzan	297789	100/10,000		1
1,3-Isobenzofurandione	85449		U190	5,000
Isobutyronitrile	78820	1,000		1
Isobutyl alcohol (I,T)	78831		U140	5,000
Isocyanic acid, 3,4-Dichlorophenyl ester	102363	500/10,000		1
Isodrin	465736	100/10,000	P060	1
Isofluorophate	55914	100		100
Isophorone	78591			5,000
Isophorone Diisocyanate	4098719	100		1
Isoprene	78795			100
Isopropanolamine dodecylbenzene sulfonate	42504461			1,000
Isopropyl chloroformate	108236	1,000		1
Isopropylmethylpyrazolyl dimethylcarbamate	119380	500		1
Isosafrole	120581		U141	100
3(2H)-Isoxazolone, 5-(aminomethyl)-	2763964		P007	1,000
Kepone	143500		U142	1
Lactonitrile	78977	1,000		1
Lasiocarpine	303344		U143	10
Lead acetate	301042		U144	#

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No. ³	RQ (Pounds)⁴
Lead arsenate	7784409 7645252 10102484			1
Lead, bis(acetato-O)tetrahydroxytri	1335326		U146	10
Lead chloride	7758954			10
Lead fluoborate	13814965			10
Lead fluoride	7783462			10
Lead iodide	10101630			10
Lead nitrate	10099748			10
Lead phosphate	7446277		U145	10
Lead stearate	7428480 1072351 52652592 56189094			10
Lead subacetate	1335326		U146	10
Lead sulfate	15739807			10
	7446142			
Lead sulfide	1314870			10
Lead thiocyanate	592870			10
Leptophos	21609905	500/10,000		1
Lewisite	541253	10		1
Lindane	58899	1,000/10,000	U129	1
Lithium chromate	14307358			10
Lithium hydride	7580678	100		1
Malathion	121755			100
Maleic acid	110167			5,000
Maleic anhydride	108316		U147	5,000
Maleic hydrazide	123331		U148	5,000
Malononitrile	109773	500/10,000	U149	1,000
Manganese, tricarbonyl methylcyclopentadienyl	12108133	100		1
MDI (Methylene diphenyl diisocyanate)	101688			5,000
Mechlorethamine	51752	10		1
MEK (Methyl ethyl ketone)	78933		U159	5,000
Melphalan	148823		U150	1
Mephosfolan	950107	500		1
Mercaptodimethur	2032657			10
Mercuric acetate	1600277	500/10,000		1
Mercuric chloride	7487947	500/10,000		1
Mercuric cyanide	592041			1
Mercuric nitrate	10045940			10
Mercuric oxide	21908532	500/10,000		1
Mercuric sulfate	7783359			10
Mercuric thiocyanate	592858			10

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Mercurous nitrate	10415755 7782867			10
Mercury	7439976		U151	1
Mercury (acetate-O)phenyl-	62384		P092	100
Mercury fulminate	628864		P065	10
Methacrolein diacetate	10476956	1,000		1
Methacrylic anhydride	760930	500		1
Methacrylonitrile (I,T)	126987	500	U152	1,000
Methacryloyl chloride	920467	100		1
Methacryloyloxyethyl isocyanate	30674807	100		1
Methamidophos	10265926	100/10,000		1
Methanamine, N-methyl-	124403		U092	1,000
Methanamine, N-methyl-N-nitroso-	62759		P082	10
Methane, bromo-	74839		U029	1,000
Methane, chloro- (I,T)	74873		U045	100
Methane, chloromethoxy-	107302		U046	1
Methane, dibromo-	74953		U068	1,000
Methane, dichloro-	75092		U080	1,000
Methane, dichlorodifluoro-	75718		U075	5,000
Methane, iodo-	74884		U138	100
Methane, isocyanato-	624839		P064	10
Methane, oxybis(chloro-	542881		P016	1
Methanesulfonyl chloride, trichloro-	594423		P118	100
Methanesulfonyl fluoride	558258	1,000		1
Methanesulfonic acid, ethyl ester	62500		U119	1
Methane, tetrachloro-	56235		U211	10
Methane, tetranitro- (R)	509148		P112	10
Methane, tribromo-	75252		U225	100
Methane, trichloro-	67663		U044	10
Methane, trichlorofluoro-	75694		U121	5,000
Methanethiol (I,T)	74931		U153	100
6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10, 10-hexa-chloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide	115297		P050	1
1,3,4-Metheno-2H-cyclobutal[cd]pentalen-2-one, 1,1a,3,3a,4,5,5a,5b,6-decachlorooctahydro-	143500		U142	1
4,7-Methano-1H-indene, 1,4,5,6,7,8,8 heptachloro-3a,4,7,7a-tetrahydro-	76448		P059	1
4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8 octachloro-2,3,3a,4,7,7a-hexahydro-	57749		U036	1
Methanol (I)	67561		U154	5,000
Methapyrilene	91805		U155	5,000
Methidathion	950378	500/10,000		1
Methiocarb	2032657	500/10,000	P199	10

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Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Methomyl	16752775	500/10,000	P066	100
Methoxychlor	72435		U247	1
Methoxyethylmercuric acetate	151382	500/10,000		1
Methyl alcohol (l)	67561		U154	5,000
Methyl aziridine	75558		P067	1
Methyl bromide	74839	1,000	U029	1,000
1-Methylbutadiene (l)	504609		U186	100
Methyl chloride (l,T)	74873		U045	100
Methyl 2-chloroacrylate	80637	500		1
Methyl chlorocarbonate (l,T)	79221		U156	1,000
Methyl chloroform	71556		U226	1,000
Methyl chloroformate	79221	500	U156	1,000
3-Methylcholanthrene	56495		U157	10
4,4'-Methylenebis(2-chloroaniline)	101144		U158	10
Methylene bromide	74953		U068	1,000
Methylene chloride	75092		U080	1,000
4,4'-Methylenedianiline	101779			10
Methylene diphenyl diisocyanate (MDI)	101688			5,000
Methyl ethyl ketone (MEK) (l,T)	78933		U159	5,000
Methyl ethyl ketone peroxide (R,T)	1338234		U160	10
Methyl hydrazine	60344	500	P068	10
Methyl iodide	74884		U138	100
Methyl isobutyl ketone	108101		U161	5,000
Methyl isocyanate	624839	500	P064	10
Methyl isothiocyanate	556616	500		1
2-Methylacetonitrile	75865		P069	10
Methyl mercaptan	74931	500	U153	100
Methyl methacrylate (l,T)	80626		U162	1,000
Methyl parathion	298000		P071	100
Methyl phenkapton	3735237	500		1
Methyl phosphonic dichloride	676971	100		1
4-Methyl-2-pentanone (l)	108101		U161	5,000
Methyl tert-butyl ether	1634044			1,000
Methyl thiocyanate	556649	10,000		1
Methylthiouracil	56042		U164	10
Methyl vinyl ketone	78944	10		1
Methylmercuric dicyanamide	502396	500/10,000		1
Methyltrichlorosilane	75796	500		1
Metolcarb	1129415	100/10,000		1
Mevinphos	7786347	500		10
Mexacarbate	315184	500/10,000		1,000
Mitomycin C	50077	500/10,000	U010	10
MNNG	70257		U163	10
Monocrotophos	6923224	10/10,000		1
Monoethylamine	75047			100

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Monomethylamine	74895			100
Muscimol	2763964	500/10,000	P007	1,000
Mustard gas	505602	500		1
Naled	300765			10
5,12-Naphthaacenedione, 8-acetyl-10-[3 amino-2,3,6-tri-deoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	20830813		U059	10
1-Naphthalenamine	134327		U167	100
2-Naphthalenamine (beta-Naphthylamine)	91598		U168	1
Naphthalenamine, N,N'-bis(2-chloroethyl)-	494031		U026	100
Naphthalene	91203		U165	100
Naphthalene, 2-chloro-	91587		U047	5,000
1,4-Naphthalenedione	130154		U166	5,000
2,7-Naphthalenedisulfonic acid, 3,3' [(3,3'-dimethyl-(1,1'-biphenyl)-4,4'-diyl)-bis(azo)] bis(5-amino-4-hydroxy)-tetrasodium salt	72571		U236	10
Naphthenic acid	1338245			100
1,4-Naphthoquinone	130154		U166	5,000
alpha-Naphthylamine	134327		U167	100
beta-Naphthylamine (2-Naphthalenamine)	91598		U168	1
alpha-Naphthylthiourea	86884		P072	100
Nickel++	7440020			100
Nickel ammonium sulfate	15699180			100
Nickel carbonyl	13463393	1	P073	10
Nickel carbonyl Ni(CO) ₄ , (T-4)-	13463393		P073	10
Nickel chloride	7718549 37211055			100
Nickel cyanide	557197		P074	10
Nickel hydroxide	12054487			10
Nickel nitrate	14216752			100
Nickel sulfate	7786814			100
Nicotine & salts	54115	100	P075	100
Nicotine sulfate	65305	100/10,000		1
Nitric acid	7697372	1,000		1,000
Nitric acid, thallium(1+) salt	10102451		U217	100
Nitric oxide	10102439	100	P076	10
p-Nitroaniline	100016		P077	5,000
Nitrobenzene (I,T)	98953	10,000	U169	1,000
4-Nitrobiphenyl	92933			10
Nitrocyclohexane	1122607	500		1
Nitrogen dioxide	10102440 10544726	100	P078	10

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Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No. ³	RQ (Pounds)⁴
Nitrogen oxide	10102439		P076	10
Nitroglycerine	55630		P081	10
Nitrophenol (mixed)	25154556			100
m-Nitrophenol	554847			100
o-Nitrophenol (2)	88755			100
p-Nitrophenol (4)	100027		U170	100
2-Nitropropane (I,T)	79469		U171	10
N-Nitrosodi-n-butylamine	924163		U172	10
N-Nitrosodiethanolamine	1116547		U173	1
N-Nitrosodiethylamine	55185		U174	1
N-Nitrosodimethylamine	62759	1,000	P082	10
N-Nitrosodiphenylamine	86306			100
N-Nitroso-N-ethylurea	759739		U176	1
N-Nitroso-N-methylurea	684935		U177	1
N-Nitroso-N-methylurethane	615532		U178	1
N-Nitrosomethylvinylamine	4549400		P084	10
N-Nitrosomorpholine	59892			1
N-Nitrosopiperidine	100754		U179	10
N-Nitrosopyrrolidine	930552		U180	1
Nitrotoluene	1321126			1,000
m-Nitrotoluene	99081			
o-Nitrotoluene	88722			
p-Nitrotoluene	99990			
5-Nitro-o-toluidine	99558		U181	100
Norbromide	991424	100/10,000		1
Octamethylpyrophosphoramide	152169		P085	100
Organorhodium complex (PMN-82-147)	0	10/10,000		1
Osmium tetroxide	20816120		P087	1,000
Ouabain	630604	100/10,000		1
7-Oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid	145733		P088	1,000
Oxamyl	23135220	100/10,000	P194	1
1,2-Oxathiolane, 2,2-dioxide	1120714		U193	10
2H-1,3,2-Oxazaphosphorin-2-amine, N,N bis (2-chloroethyl)tetrahydro-, 2-oxide	50180		U058	10
Oxetane, 3,3-bis(chloromethyl)-	78717	500		1
Oxirane (I,T)	75218		U115	10
Oxiranecarboxyaldehyde	765344		U126	10
Oxirane, (chloromethyl)-	106898		U041	100
Oxydisulfoton	2497076	500		1
Ozone	10028156	100		1
Paraformaldehyde	30525894			1,000
Paraldehyde	123637		U182	1,000
Paraquat	1910425	10/10,000		1
Paraquat methosulfate	2074502	10/10,000		1

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Parathion	56382	100	P089	10
Parathion-methyl	298000	100/10,000		100
Paris green	12002038	500/10,000		100
PCBs	1336363			
Aroclor 1016	12674112			1
Aroclor 1221	11104282			1
Aroclor 1232	11141165			1
Aroclor 1242	53469219			1
Aroclor 1248	12672296			1
Aroclor 1254	11097691			1
Aroclor 1260	11096825			1
PCNB (Pentachloronitrobenzene)	82688		U185	100
Pentaborane	19624227	500		1
Pentachlorobenzene	608935		U183	10
Pentachloroethane	76017		U184	10
Pentachlorophenol	87865		U242	10
Pentachloronitrobenzene (PCNB)	82688		U185	100
Pentadecylamine	2570265	100/10,000		1
Paracetic acid	79210	500		1
1,3-Pentadiene (I)	504609		U186	100
Perachloroethylene	127184		U210	100
Perchloromethylmercaptan	594423	500		100
Phenacetin	62442		U187	100
Phenanthrene	85018			5,000
Phenol	108952	500/10,000	U188	1,000
Phenol, 2-chloro-	95578		U048	100
Phenol, 4-chloro-3-methyl-	59507		U039	5,000
Phenol, 2-cyclohexyl-4,6-dinitro-	131895		P034	100
Phenol, 2,4-dichloro-	120832		U081	100
Phenol, 2,6-dichloro-	87650		U082	100
Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	56531		U089	1
Phenol, 2,4-dimethyl-	105679		U101	100
Phenol, 2,4-dinitro-	51285		P048	10
Phenol, methyl-	1319773		U052	1,000
m-Cresol	108394			
o-Cresol	95487			
p-Cresol	106445			
Phenol, 2-methyl-4,6-dinitro-and salts	534521		P047	10
Phenol, 2,2'-methylenebis[3,4,6-trichloro-	70304		U132	100
Phenol, 2,2'-thiobis(4-chloro-6-methyl)-	4418660	100/10,000		1
Phenol, 2-(1-methylpropyl)-4,6-dinitro	88857		P020	1,000
Phenol, 3-(1-methylethyl)-, methylcarbamate	64006	500/10,000		1
Phenol, 4-nitro-	100027		U170	100

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Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No. ³	RQ (Pounds)⁴
Phenol, pentachloro-	87865		U242	10
Phenol, 2,3,4,6-tetrachloro-	58902		U212	10
Phenol, 2,4,5-trichloro-	95954		U230	10
Phenol, 2,4,6-trichloro-	88062		U231	10
Phenol, 2,4,6-trinitro-, ammonium salt	131748		P009	10
Phenoxarsine, 10,10'-oxydi-	58366	500/10,000		1
L-Phenylalanine, 4-[bis(2-chloroethyl)aminol]	148823		U150	1
Phenyl dichloroarsine	696286	500		1
1,10-(1,2-Phenylene)pyrene	193395		U137	100
p-Phenylenediamine	106503			5,000
Phenylhydrazine hydrochloride	59881	1,000/10,000		1
Phenylmercury acetate	62384	500/10,000	P092	100
Phenylsilatrane	2097190	100/10,000		1
Phenylthiourea	103855	100/10,000	P093	100
Phorate	298022	10	P094	10
Phosacetim	4104147	100/10,000		1
Phosfolan	947024	100/10,000		1
Phosgene	75445	10	P095	10
Phosmet	732116	10/10,000		1
Phosphamidon	13171216	100		1
Phosphine	7803512	500		100
Phosphorothioic acid, o,o-Dimethyl-s (2-Methylthio) ethyl ester	2587908	500		1
Phosphorothioic acid, methyl-, o-ethyl o-(4-(methylthio)phenyl) ester	2703131	500		1
Phosphorothioic acid, methyl-, s-(2-(bis(1-methylethyl)amino)ethyl o-ethyl ester	50782699	100		1
Phosphorothioic acid, methyl-, 0-(4-nitrophenyl) o-phenyl ester	2665307	500		1
Phosphoric acid	7664382			5,000
Phosphoric acid, diethyl 4-nitrophenyl ester	311455		P041	100
Phosphoric acid, dimethyl 4-(methylthio) phenyl ester	3254635	500		1
Phosphoric acid, lead(2+) salt (2:3)	7446277	500	U145	10
Phosphorodithioic acid, O,O-diethyl S-[2 (ethylthio)ethyl]ester	298044		P039	1
Phosphorodithioic acid, O,O-diethyl S-(ethylthio), methyl ester	298022		P094	10
Phosphorodithioic acid, O,O-diethyl S-methyl ester	3288582		U087	5,000
Phosphorodithioic acid, O,O-dimethyl S-[2(methyl-amino)-2-oxoethyl] ester	60515		P044	10

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Phosphorofluonic acid, bis(1-methylethyl) ester	55914		P043	100
Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56382		P089	10
Phosphorothioic acid, O,[4-[(dimethylamino)sulfonyl]phenyl]O,O-dimethyl ester	52857		P097	1,000
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	298000		P071	100
Phosphorothioic acid, O,O-diethyl O pyrazinyl ester	297972		P040	100
Phosphorus	7723140	100		1
Phosphorus oxychloride	10025873	500		1,000
Phosphorous pentachloride	10026138	500		1
Phosphorus pentasulfide (R)	1314803		U189	100
Phosphorus pentoxide	1314563	10		1
Phosphorus trichloride	7719122	1,000		1,000
Phthalic anhydride	85449		U190	5,000
Physostigmine	57476	100/10,000	P204	1
Physostigmine, salicylate (1:1)	57647	100/10,000		1
2-Picoline	109068		U191	5,000
Picotoxin	124878	500/10,000		1
Piperidine	110894	1,000		1
Piperidine, 1-nitroso-	100754		U179	10
Pirimifos-ethyl	23505411	1,000		1
Plumbane, tetraethyl-	78002		P110	10
Polychlorinated biphenyls (See PCBs or Aroclor)	1336363			1
Potassium arsenate	7784410			1
Potassium arsenite	10124502	500/10,000		1
Potassium bichromate	7778509			10
Potassium chromate	7789006			10
Potassium cyanide	151508	100	P098	10
Potassium hydroxide	1310583			1,000
Potassium permanganate	7722647			100
Potassium silver cyanide	506616	500	P099	1
Promecarb	2631370	500/10,000		1
Pronamide	23950585		U192	5,000
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	116063		P070	1
1-Propanamine (I,T)	107108		U194	5,000
1-Propanamine, N-propyl-	142847		U110	5,000
1-Propanamine, N-nitroso-N-propyl-	621647		U111	10
Propane, 1,2-dibromo-3-chloro	96128		U066	1

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Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Propane, 2-nitro- (I,T)	79469		U171	10
1,3-Propane sultone	1120714		U193	10
Propane 1,2-dichloro-	78875		U083	1,000
Propanedinitrile	109773		U149	1,000
Propanenitrile	107120		P101	10
Propanenitrile, 3-chloro-	542767		P027	1,000
Propanenitrile, 2-hydroxy-2-methyl-	75865		P069	10
Propane, 2,2'-oxybis[2-chloro-	108601		U027	1,000
1,2,3-Propanetrol, trinitrate- (R)	55630		P081	10
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126727		U235	10
1-Propanol, 2-methyl- (I,T)	78831		U140	5,000
2-Propanone (I)	67641		U002	5,000
2-Propanone, 1-bromo-	598312		P017	1,000
Propargite	2312358			10
Propargyl alcohol	107197		P102	1,000
Propargyl bromide	106967	10		1
2-Propenal	107028		P003	1
2-Propenamide	79061		U007	5,000
1-Propene, 1,1,2,3,3,3-hexachloro-	1888717		U243	1,000
1-Propene, 1,3-dichloro-	542756		U084	100
2-Propenenitrile	107131		U009	100
2-Propenenitrile, 2-methyl- (I,T)	126987		U152	1,000
2-Propenoic acid (I)	79107		U008	5,000
2-Prepenoic acid, ethyl ester (I)	140885		U113	1,000
2-Prepenoic acid, 2-methyl-, ethyl ester	97632		U118	1,000
2-Prepenoic acid, 2-methyl-, methyl ester (I,T)	80626		U162	1,000
2-Propen-1-ol	107186		P005	100
Propiolactone, beta-	57578	500		1
Propionaldehyde	123386			1,000
Propionic acid	79094			5,000
Propionic acid, 2-(2,4,5-trichlorophenoxy)-	93721		U233	100
Propionic anhydride	123626			5,000
Propoxor (Baygon)	114261		U411	100
Propionitrile	107120	500		10
Propionitrile, 3-chloro-	542767	1,000		1,000
Propiophenone, 1, 4-amino phenyl	70699	100/10,000		1
n-Propylamine	107108		U194	5,000
Propyl chloroformate	109615	500		1
Propylene dichloride	78875		U083	1,000
Propylene oxide	75569	10,000		100
1,2-Propylenimine	75558	10,000	P067	1
2-Propyn-1-ol	107197		P102	1,000

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Prothoate	2275185	100/10,000		1
Pyrene	129000	1,000/10,000		5,000
Pyrethrins	121299 121211 8003347			1
3,6-Pyridazinedione, 1,2-dihydro-	123331		U148	5,000
4-Pyridinamine	504245		P008	1,000
Pyridine	110861		U196	1,000
Pyridine, 2-methyl-	109068		U191	5,000
Pyridine, 2-methyl-5-vinyl-	140761	500		1
Pyridine, 4-amino-	504245	500/10,000		1,000
Pyridine, 4-nitro-, 1-oxide	1124330	500/10,000		1
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)	54115		P075	100
2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	66751		U237	10
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56042		U164	10
Pyriminil	53558251	100/10,000		1
Pyrrolidine, 1-nitroso-	930552		U180	1
Quinoline	91225			5,000
Quinone (p-Benzoquinone)	106514		U197	10
Quintobenzene	82688		U185	100
Reserpine	50555		U200	5,000
Resorcinol	108463		U201	5,000
Saccharin and salts	81072		U202	100
Salcomine	14167181	500/10,000		1
Sarin	107448	10		1
Safole	94597		U203	100
Selenious acid	7783008	1,000/10,000	U204	10
Selenious acid, dithallium (1+) salt	12039520		P114	1,000
Selenium ++	7782492			100
Selenium dioxide	7446084		U204	10
Selenium oxychloride	7791233	500		1
Selenium sulfide (R,T)	7488564		U205	10
Selenourea	630104		P103	1,000
Semicarbazide hydrochloride	563417	1,000/10,000		1
L-Serine, diazoacetate (ester)	115026		U015	1
Silane, (4-aminobutyl)diethoxymethyl-	3037727	1,000		1
Silver ++	7440224			1,000
Silver cyanide	506649		P104	1
Silver nitrate	7761888			1
Silvex (2,4,5-TP)	93721		U233	100
Sodium	7440235			10
Sodium arsenate	7631892	1,000/10,000		1
Sodium arsenite	7784465	500/10,000		1

Table B-4

Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
Sodium azide	26628228	500	P105	1,000
Sodium bichromate	10588019			10
Sodium bifluoride	1333831			100
Sodium bisulfite	7631905			5,000
Sodium cacodylate	124652	100/10,000		1
Sodium chromate	7775113			10
Sodium cyanide	143339	100	P106	10
Sodium dodecylbenzenesulfonate	25155300			1,000
Sodium fluoride	7681494			1,000
Sodium fluoroacetate	62748	10/10,000		10
Sodium hydrosulfide	16721805			5,000
Sodium hydroxide	1310732			1,000
Sodium hypochlorite	7681529 10022705			100
Sodium methylate	124414			1,000
Sodium nitrite	7632000			100
Sodium prentachlorophenate	131522	100/10,000		1
Sodium phosphate, dibasic	7558794 10039324 10140655			5,000
Sodium phosphate, tribasic	7601549 7758294 7785844 10101890 10124568 10361894			5,000
Sodium selenate	13410010	100/10,000		1
Sodium selenite	10102188 7782823	100/10,000		100
Sodium tellurite	10102202	500/10,000		1
Stannane, acetoxypriphenyl	900958	500/10,000		1
Streptozotocin	18883664		U206	1
Strontium chromate	7789062			10
Strychnidin-10-one	57249		P108	10
Strychnidin-10-one, 2,3-dimethoxy-	357573		P018	100
Strychnine, & salts	572494	100/10,000	P108	10
Strychnine sulfate	60413	100/10,000		1
Styrene	100425			1,000
Styrene oxide	96093			100
Sulfotep	3689245	500		100
Sulfoxide, 3-chloropropyl octyl	3569571	500		1
Sulfur monochloride	12771083			1,000
Sulfur dioxide	7446095	500		1
Sulfur phosphide (R)	1314803		U189	100
Sulfur tetrafluoride	7783600	100		1

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Sulfur trioxide	7446119	100		1
Sulfuric acid	7664939 8014957	1,000		1,000
Sulfuric acid, dithallium (1+) salt	7446186 10031591		P115	100
Sulfuric acid, dimethyl ester	77781		U103	100
Tabun	77816	10		1
2,4,5-T acid	93765		U232	1,000
2,4,5-T amines	2008460 1319728 3813147 6369966 6369977			5,000
Tellurium	13494809	500/10,000		1
Tellurium hexafluoride	7783804	100		1
2,4,5-T esters	93798 1928478 2545597 25168154 61792072			1,000
2,4,5-T salts	13560991			1,000
2,4,5-T	93765		U232	1,000
TDE (Dichloro diphenyl dichloroethane)	72548		U060	1
TEPP (Tetraethyl ester diphosphoric acid)	107493	100		10
Terbufos	13071799	100		1
1,2,4,5-Tetrachlorobenzene	95943		U207	5,000
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746016			1
1,1,1,2-Tetrachloroethane	630206		U208	100
1,1,2,2-Tetrachloroethane	79345		U209	100
Tetrachloroethene	127184		U210	100
Tetrachloroethylene	127184		U210	100
2,3,4,6-Tetrachlorophenol	58902		U212	10
Tetraethyl lead	78002	100	P110	10
Tetraethyl pyrophosphate	107493		P111	10
Tetraethyldithiopyrophosphate	3689245		P109	100
Tetraethyltin	597648	100		1
Tetramethyllead	75741	100		1
Tetrahydrofuran (l)	109999		U213	1,000
Tetranitromethane (R)	509148	500	P112	10
Tetraphosphoric acid, hexaethyl ester	757584		P062	100
Thallic oxide	1314325		P113	100
Thallium ++	7440280			1,000
Thallium acetate	563688		U214	100
Thallium carbonate	6533739		U215	100

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Thallium chloride	7791120		U216	100
Thallium nitrate	10102451		U217	100
Thallium oxide	1314325		P113	100
Thallium selenite	12039520		P114	1,000
Thallium sulfate	7446186 10031591	100/10,000	P115	100
Thallos carbonate (Thallium (I) carbonate)	6533739	100/10,000	U215	100
Thallos chloride (Thallium (I) chloride)	7791120	100/10,000	U216	100
Thallos malonate (Thallium (I) malonate)	2757188	100/10,000		1
Thallos sulfate (Thallium (I) sulfate)	7446186	100/10,000	P115	100
Thioacetamide	62555		U218	10
Thiocarbazine	2231574	1,000/10,000		1
Thiodiphosphoric acid, tetraethyl ester	3689245		P109	100
Thiofanox	39196184	100/10,000	P045	100
Thioimidodicarbonic diamide [(H ₂ N)C(S)] ₂ NH	541537		P049	100
Thiomethanol (I,T)	74931		U153	100
Thionazin	297972	500		100
Thioperoxydicarbonic diamide [(H ₂ N)C(S)] ₂ S ₂ , tetra-methyl-	137268		U244	10
Thiophenol	108985	500	P104	100
Thiosemicarbazide	79196	100/10,000	P116	100
Thiourea	62566		U219	10
Thiourea, (2-chlorophenyl)-	5344821	100/10,000	P026	100
Thiourea, (2-methylphenyl)-	614788	500/10,000		1
Thiourea, 1-naphthalenyl-	86884		P072	100
Thiourea, phenyl-	103855		P093	100
Thiram	137268		U244	10
Titanium tetrachloride	7550450	100		1,000
Toluene	108883		U220	1,000
Toluenediamine	95807 496720 823405 25376458		U221	10
Toluene diisocyanate (R,T)	584849 91087 26471625	500 100	U223	100 100
o-Toluidine	95534		U328	100
p-Toluidine	106490		U353	100
o-Toluidine hydrochloride	636215		U222	100
Toxaphene	8001352		P123	1
2,4,5-TP acid	93721		U233	100
2,4,5-TP acid esters	32534955			100
1H-1,2,4-Triazol-3-amine	61825		U011	10

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Trans-1,4-dichlorobutene	110576	500		1
Triamiphos	1031476	500/10,000		1
Triazofos	24017478	500		1
Trichloroacetyl chloride	76028	500		1
Trichlorfon	52686			100
1,2,4-Trichlorobenzene	120821			100
1,1,1-Trichloroethane	71556		U226	1,000
1,1,2-Trichloroethane	79005		U227	100
Trichloroethene	79016		U228	100
Trichloroethylene	79016		U228	100
Trichloroethylsilane	115219	500		1
Trichloronate	327980	500		1
Trichloromethanesulfonyl chloride	594423		P118	100
Trichloromonofluoromethane	75694		U121	5,000
Trichlorophenol	21567822			10
2,3,4-Trichlorophenol	15950660			
2,3,5-Trichlorophenol	933788			
2,3,6-Trichlorophenol	933755			
2,4,5-Trichlorophenol	95954		U230	10
2,4,6-Trichlorophenol	88062		U231	10
3,4,5-Trichlorophenol	609198			
Trichlorophenylsilane	98135	500		1
Trichloro(chloromethyl)silane	1558254	100		1
Trichloro(dichlorophenyl)silane	27137855	500		1
Triethanolamine dodecylbenzene-sulfonate	27323417			1,000
Triethoxysilane	998301	500		1
Trifluralin	1582098			10
Triethylamine	121448			5,000
Trimethylamine	75503			100
Trimethylchlorsilane	75774	1,000		1
2,2,4-Trimethylpentane	540841			1,000
Trimethylolpropane phosphite	824113	100/10,000		1
Trimethyltin chloride	1066451	500/10,000		1
1,3,5-Trinitrobenzene (R,T)	99354		U234	10
1,3,5-Trioxane, 2,4,6-trimethyl-	123637		U182	1,000
Triphenyltin chloride	639587	500/10,000		1
Tris(2-chloroethyl)amine	555771	100		1
Tris(2,3-dibromopropyl) phosphate	126727		U235	10
Trypan blue	72571		U236	10
Unlisted Hazardous Wastes Characteristic of Ignitability	NA		D001	100
Unlisted Hazardous Wastes Characteristic of Corrosivity	NA		D002	100

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Unlisted Hazardous Wastes Characteristic of Reactivity	NA		D003	100
Unlisted Hazardous Wastes Characteristic of Toxicity				
Arsenic			D004	1
Barium			D005	1,000
Benzene			D018	10
Cadmium			D006	10
Carbon Tetrachloride			D019	10
Chlordane			D020	1
Chlorobenzene			D021	100
Chloroform			D022	10
Chromium			D007	10
o-Cresol			D023	100
m-Cresol			D024	100
p-Cresol			D025	100
Cresol			D026	100
2,4-D (Dichlorophenoxyacetic acid)			D016	100
1,4-Dichlorobenzene			D027	100
1,2-Dichloroethane			D028	100
1,1-Dichloroethylene			D029	100
2,4-Dinitrotoluene			D030	10
Endrin			D012	1
Heptachlor (and epoxide)			D031	1
Hexachlorobenzene			D032	10
Hexachlorobutadiene			D033	1
Hexachloroethane			D034	100
Lead			D008	10
Lindane			D013	1
Mercury			D009	1
Methoxychlor			D014	1
Methyl ethyl ketone			D035	5,000
Nitrobenzene			D036	1,000
Pentachlorophenol			D037	10
Pyridine			D038	1,000
Selenium			D010	10
Silver			D011	1
Tetrachloroethylene			D039	100
Toxaphene			D015	1
Trichloroethylene			D040	100
2,4,5 Trichlorophenol			D041	10
2,4,5-TP			D017	100
Vinyl chloride			D043	1
Uracil mustard	66751		U237	10
Uranyl acetate	541093			100
Uranyl nitrate	10102064 36478769			100

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Urea, N-ethyl-N-nitroso	759739		U176	1
Urea, N-methyl-N-nitroso	684935		U177	1
Urethane (Carbamic acid ethyl ester)	51796		U238	100
Valinomycin	2001958	1,000/10,000		1
Vanadic acid, ammonium salt	7803556		P119	1,000
Vanadic oxide V ₂ O ₅	1314621		P120	1,000
Vanadic pentoxide	1314621		P120	1,000
Vanadium pentoxide	1314621	100/10,000		1,000
Vanadyl sulfate	27774136			1,000
Vinyl chloride	75014		U043	1
Vinyl acetate	108054			5,000
Vinyl acetate monomer	108054	1,000		5,000
Vinylamine, N-methyl-N-nitroso-	4549400		P084	10
Vinyl bromide	593602			100
Vinylidene chloride	75354		U078	100
Warfarin, & salts, when present at concentrations greater than 0.3%	81812	500/10,000	P001	100
Warfarin sodium	129066	100/10,000		100
Xylene (mixed)	1330207		U239	100
m-Benzene, dimethyl	108383			1,000
o-Benzene, dimethyl	95476			1,000
p-Benzene, dimethyl	106423			100
Xylenol	1300716			1,000
Xylylene dichloride	28347139	100/10,000		1
Yohimban-16-carboxylic acid, 11,17 dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester (3-beta, 16-beta,17-alpha,18-beta,20-alpha)-	50555		U200	5,000
Zinc ++	7440666			1,000
Zinc acetate	557346			1,000
Zinc ammonium chloride	52628258 14639975 14639986			1,000
Zinc borate	1332076			1,000
Zinc bromide	7699458			1,000
Zinc carbonate	3486359			1,000
Zinc chloride	7646857			1,000
Zinc cyanide	557211		P121	10
Zinc, dichloro(4,4-dimethyl-5((((methyl-amino)carbonyl)oxy)imino)pentaenitrile)-, (t-4)-	58270089	100/10,000		1
Zinc fluoride	7783495			1,000
Zinc formate	557415			1,000
Zinc hydrosulfite	7779864			1,000
Zinc nitrate	7779886			1,000

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
Zinc phenosulfonate	127822			5,000
Zinc phosphide	1314847	500	P122	100
Zinc phosphide Zn ₃ P ₂ , when present at concentrations greater than 10%	1314847		P122	100
Zinc silicofluoride	16871719			5,000
Zinc sulfate	7733020			1,000
Zirconium nitrate	13746899			5,000
Zirconium potassium fluoride	16923958			1,000
Zirconium sulfate	14644612			5,000
Zirconium tetrachloride	10026116			5,000
F001				
The following spent halogenated solvents used in degreasing; all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127184		U210	100
(b) Trichloroethylene	79016		U228	100
(c) Methylene chloride	75092		U080	1,000
(d) 1,1,1-Trichloroethane	71556		U226	1,000
(e) Carbon tetrachloride	56235		U211	10
(f) Chlorinated fluorocarbons	NA			5,000
F002				
The following spent halogenated solvents: all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127184		U210	100
(b) Methylene chloride	75092		U080	1,000
(c) Trichloroethylene	79016		U228	100
(d) 1,1,1-Trichloroethane	71556		U226	1,000
(e) Chlorobenzene	108907		U037	100
(f) 1,1,2-Trichloro-1,2,2 trifluoroethane	76131			5,000
(g) o-Dichlorobenzene	95501		U070	100
(h) Trichlorofluoromethane	75694		U121	5,000
(i) 1,1,2-Trichloroethane	79005		U227	100
F003				
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Xylene	1330207			1,000
(b) Acetone	67641			5,000
(c) Ethyl acetate	141786			5,000
(d) Ethylbenzene	100414			1,000
(e) Ethyl ether	60297			100
(f) Methyl isobutyl ketone	108101			5,000
(g) n-Butyl alcohol	71363			5,000
(h) Cyclohexanone	108941			5,000
(i) Methanol	67561			5,000

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
F004 The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents: (a) Cresols/Cresylic acid (b) Nitrobenzene	 1319773 98953	 	F004 U052 U169	100 100 1,000
F005 The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents: (a) Toluene (b) Methyl ethyl ketone (c) Carbon disulfide (d) Isobutanol (e) Pyndine	 108883 78933 75150 78831 110861	 	F005 U220 U159 P022 U140 U196	100 1,000 5,000 100 5,000 1,000
F006 Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum, (2) tin plating on carbon steel, (3) zinc plating (segregated basis) on carbon steel, (4) aluminum or zinc-aluminum plating on carbon steel, (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel, and (6) chemical etching and milling of aluminum.			F006	10
F007 Spent cyanide plating bath solutions from electroplating operations.			F007	10
F008 Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.			F008	10
F009 Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.			F009	10
F010 Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.			F010	10
F011 Spent cyanide solution from salt bath pot cleaning from metal heat treating operations.			F011	10
F012 Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.			F012	10
F019 Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive coating process.			F019	10
F020 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri-or-tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)			F020	1
F021 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.			F021	1

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
F022 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.			F022	1
F023 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexa-chlorophene from highly purified, 2,4,5-tri-chlorophenol.)			F023	1
F024 Wastes, including but not limited to distillation residues, heavy ends, tars, and reactor cleanout wastes, from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent dessicants(sic), wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in Section 261.32.)			F024	1
F025 Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.			F025	1
F026 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-penta-, or hexachlorobenzene under alkaline conditions.			F026	1
F027 Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-tri-chlorophenol as the sole component.)			F027	1
F028 Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Numbers F020, F021, F022, F023, F026, and F027.			K028	1
F032 Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with 261.35 of this chapter or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.			F032	1
F034 Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.			F034	1

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Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
F035 Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.			F035	1
F037 Petroleum refinery primary oil/water/solids separation sludge--any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/solids separators; tanks and impoundment; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.			F037	1
F038 Petroleum refinery secondary (emulsified) oil/water/solids separation sludge--any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from once-through non-contact cooling waters segregated from treatment from other process or oil cooling wastes, sludges and floats generated in aggressive biological treatment units as defined in 261.31(b) (2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.			F038	1
K001 Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.			K001	1
K002 Wastewater treatment sludge from the production of chrome yellow and orange pigments.			K002	10
K003 Wastewater treatment sludge from the production of molybdate orange pigments.			K003	10
K004 Wastewater treatment sludge from the production of zinc yellow pigments.			K004	10
K005 Wastewater treatment sludge from the production of chrome green pigments.			K005	10
K006 Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).			K006	10
K007 Wastewater treatment sludge from the production of iron blue pigments.			K007	10
K008 Oven residue from the production of chrome oxide green pigments.			K008	10
K009 Distillation bottoms from the production of acetaldehyde from ethylene.			K009	10
K010 Distillation side cuts from the production of acetaldehyde from ethylene.			K010	10

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
K011 Bottom stream from the wastewater stripper in the production of acrylonitrile.			K011	10
K013 Bottom stream from the acetonitrile column in the production of acrylonitrile.			K013	10
K014 Bottoms from the acetonitrile purification column in the production of acrylonitrile.			K014	5,000
K015 Still bottoms from the distillation of benzyl chloride.			K015	10
K016 Heavy ends or distillation residues from the production of carbon tetrachloride.			K016	1
K017 Heavy ends (still bottoms) from the purification column in the production of epi-chlorohydrin.			K017	10
K018 Heavy ends from the fractionation column in ethyl chloride production.			K018	1
K019 Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.			K019	1
K020 Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.			K020	1
K021 Aqueous spent antimony catalyst waste from fluoromethanes production.			K021	10
K022 Distillation bottom tars from the production of phenol/acetone from cumene.			K022	1
K023 Distillation light ends from the production of ophthalic anhydride from naphthalene.			K023	5,000
K024 Distillation bottoms from the production of phthalic anhydride from naphthalene.			K024	5,000
K025 Distillation bottoms from the production of nitrobenzene by the nitration of benzene.			K025	10
K026 Stripping still tails from the production of methyl ethyl pyridines.			K026	1,000
K027 Centrifuge and distillation residues from toluene diisocyanate production.			K027	10
K028 Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.			K028	1
K029 Waste from the product steam stripper in the production of 1,1,1-trichloroethane.			K029	1
K030 Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.			K030	1
K031 By-product salts generated in the production of MSMA and cacodylic acid.			K031	1
K032 Wastewater treatment sludge from the production of chlordane.			K032	10
K033 Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.			K033	10
K034 Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.			K034	10

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
K035 Wastewater treatment sludges generated in the production of creosote.			K035	1
K036 Still bottoms from toluene reclamation distillation in the production of disulfoton.			K036	1
K037 Wastewater treatment sludges from the production of disulfoton.			K037	1
K038 Wastewater from the washing and stripping of phorate production.			K038	10
K039 Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.			K039	10
K040 Wastewater treatment sludge from the production of phorate.			K040	10
K041 Wastewater treatment sludge from the production of toxaphene.			K041	1
K042 Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.			K042	10
K043 2,6-Dichlorophenol waste from the production of 2,4-D.			K043	10
K044 Wastewater treatment sludges from the manufacturing and processing of explosives.			K044	10
K045 Spent carbon from the treatment of wastewater containing explosives.			K045	10
K046 Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.			K046	10
K047 Pink/red water from TNT operations.			K047	10
K048 Dissolved air flotation (DAF) float from the petroleum refining industry.			K048	10
K049 Slop oil emulsion solids from the petroleum refining industry.			K049	10
K050 Heat exchanger bundle cleaning sludge from the petroleum refining industry.			K050	10
K051 API separator sludge from the petroleum refining industry.			K051	10
K052 Tank bottoms (leaded) from the petroleum refining industry.			K052	10
K060 Ammonia still lime sludge from coking operations.			K060	1
K061 Emission control dust/sludge from the primary production of steel in electric furnaces.			K061	10
K062 Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).			K062	10

Table B-4				
Hazardous Waste/Substance/Material	CAS No.¹	Threshold Planning Quantity (Pounds)²	USEPA HW No.³	RQ (Pounds)⁴
K064 Acid plant blowdown slurry/sludge resulting from thickening of blowdown slurry from primary copper production.			K064	10
K065 Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.			K065	10
K066 Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.			K066	10
K069 Emission control dust/sludge from secondary lead smelting.			K069	10
K071 Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.			K071	1
K073 Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.			K073	10
K083 Distillation bottoms from aniline extraction.			K083	100
K084 Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.			K084	1
K085 Distillation or fractionation column bottoms from the production of chlorobenzenes.			K085	10
K086 Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.			K086	10
K087 Decanter tank tar sludge from coking operations.			K087	100
K088 Spent potliners from primary aluminum reduction.			K088	10
K090 Emission control dust or sludge from ferrochromiumsilicon production.			K090	10
K091 Emission control dust or sludge from ferrochromium production.			K091	10
K093 Distillation light ends from the production of phthalic anhydride from ortho-xylene.			K093	5,000
K094 Distillation bottoms from the production of phthalic anhydride from ortho-xylene.			K094	5,000
K095 Distillation bottoms from the production of 1,1,1-trichloroethane.			K095	100
K096 Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.			K096	100
K097 Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.			K097	1

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
K098 Untreated process wastewater from the production of toxaphene.			K098	1
K099 Untreated wastewater from the production of 2,4-D.			K099	10
K100 Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.			K100	10
K101 Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.			K101	1
K102 Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.			K102	1
K103 Process residues from aniline extraction from the production of aniline.			K103	100
K104 Combined wastewater streams generated from nitrobenzene/aniline production.			K104	10
K105 Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.			K105	10
K106 Wastewater treatment sludge from the mercury cell process in chlorine production.			K106	1
K107 Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazines.			K107	10
K108 Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.			K108	10
K109 Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.			K109	10
K110 Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.			K110	10
K111 Product washwaters from the production of dinitrotoluene via nitration of toluene.			K111	10
K112 Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.			K112	10
K113 Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.			K113	10
K114 Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.			K114	10
K115 Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.			K115	10

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
K116 Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.			K116	10
K117 Wastewater from the reaction vent gas scrubber in the production of ethylene bromide via bromination of ethene.			K117	1
K118 Spent absorbent solids from purification of ethylene dibromide in the production of ethylene dibromide.			K118	1
K123 Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.			K123	10
K124 Reactor vent scrubber water from the production of ethylene- bisdithiocarbamic acid and its salts.			K124	10
K125 Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.			K125	10
K126 Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylene-bisdithiocarbamic acid and its salts.			K126	10
K131 Wastewater from the reactor and spent sulfuric acid from the acid dryer in the production of methyl bromide.			K131	100
K132 Spent absorbent and wastewater solids from the production of methyl bromide.			K132	1,000
K136 Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.			K136	1
K141 Process residues from the recovery of coal tar, including but not limited to, tar collecting sump residues from the production of coke or coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).			K141	1
K142 Tar storage tank residues from the production of coke or from the recovery of coke by-products produced from coal.			K142	1
K143 Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.			K143	1
K144 Wastewater treatment sludges from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.			K144	1
K145 Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.			K145	1
K147 Tar storage tank residues from coal tar refining.			K147	1

Table B-4

Hazardous Waste/Substance/Material	CAS No. ¹	Threshold Planning Quantity (Pounds) ²	USEPA HW No. ³	RQ (Pounds) ⁴
K148 Residues from coal tar distillation, including, but not limited to, still bottoms.			K148	1
K149 Distillation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. [This waste does not include still bottoms from the distillation of benzyl chloride.]			K149	10
K150 Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.			K150	10
K151 Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.			K151	10
K157 Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not include sludges derived from the treatment of these wastewaters.)			K157	++
K158 Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes.			K158	++
K159 Organics from the treatment of thiocarbamate wastes.			K159	++
K160 Solids (including filter wastes, separation solids, and spent catalysts) from the production of thio-carbamates and solids from the treatment of thiocarbamate wastes.			K160	++
K161 Purification solids (including filtration, evaporation, and centrifugation solids), bag house dust, and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126.)			K161	++

Notes:

¹ Chemical Abstract Service (CAS) Registry Number.

² Quantity in storage above which Environmental Executive Agent must be notified (See Chapter 5).

³ U.S. Environmental Protection Agency Hazardous Waste Number.

⁴ Reportable quantity release that requires notification (See Chapter 18).

++ No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 micrometers (0.004 inches).

+++ The RQ for asbestos is limited to friable forms only.

Indicates that the RQ is subject to change when the assessment of potential carcinogenicity is completed.

The statutory RQ for this hazardous substance may be adjusted in a future rulemaking; until then the statutory RQ applies.

1* Indicates that the 1-pound RQ is a statutory RQ.

** Indicates that no RQ is being assigned to the generic or broad class.

(1+) Indicates that the statutory source for designation of this hazardous substance under CERCLA is CWA section 311(b)(4).

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- (2+) Indicates that the statutory source for designation of this hazardous substance under CERCLA is CWA section 30711(a)(4).
- (3+) Indicates that the statutory source for designation of this hazardous substance under CERCLA is CAA section 112.
- (4+) Indicates that the statutory source for designation of this hazardous substance under CERCLA is RCRA section 3001.

APPENDIX C
DETERMINATION OF WORST CASE DISCHARGE PLANNING VOLUME

C-1. This appendix provides criteria to determine, on an installation-specific basis, the extent of a worst-case discharge.

C-2. This Appendix provides criteria to determine the volume of oil or hazardous substance to be used in planning for a worst case discharge.

a. **Single Tank Facilities.** For facilities containing only one above-ground oil or hazardous substance storage tank, the worst case discharge planning volume equals the capacity of the oil storage tank. If adequate secondary containment (sufficiently large to contain the capacity of the above ground oil or hazardous substance storage tank plus sufficient freeboard to allow for precipitation) exists for the oil storage tank, multiply the capacity of the tank by 0.8.

b. **Multiple Tank Facilities.**

(1) Facilities having no secondary containment. If none of the above ground storage tanks at the facility have adequate secondary containment, the worst case planning volume equals the total above ground oil and hazardous substance storage capacity at the facility.

(2) Facilities having complete secondary containment. If every above ground storage tank at the facility has adequate secondary containment, the worst case planning volume equals the capacity of the largest single above ground oil or hazardous substance storage tank.

(3) Facilities having partial secondary containment. If some, but not all above ground storage tanks at the facility have adequate secondary containment, the worst case planning volume equals the sum of: i. the total capacity of the above ground oil and hazardous substance storage tanks that lack adequate secondary containment; plus ii. the capacity of the largest single above ground oil or hazardous substance storage tank that has adequate secondary containment.

c. For purposes of this appendix, the term "adequate secondary containment" means an impervious containment system such as a dike, berm, containment curb, drainage system or other device that will prevent the escape of spilled material into the surrounding soil.

